OCT 1 1919

Vol. I.—No. 5. MAY, 1917.

THE BRITISH JOURNAL OF OPHTHALMOLOGY,

INCORPORATING

THE ROYAL LONDON OPHTHALMIC HOSPITAL REPORTS,

THE OPHTHALMIC REVIEW,

AND

THE OPHTHALMOSCOPE.

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London:

Printed and Published for the British Journal of Ophthalmology, Ltd., By Geo. Pulman & Sons, Ltd., at 24, Thayer Street, Marylebone, W.

Issued Monthly: Single Copy 4 shillings net:

Annual Subscription 31 shillings and 6 pence, post free.

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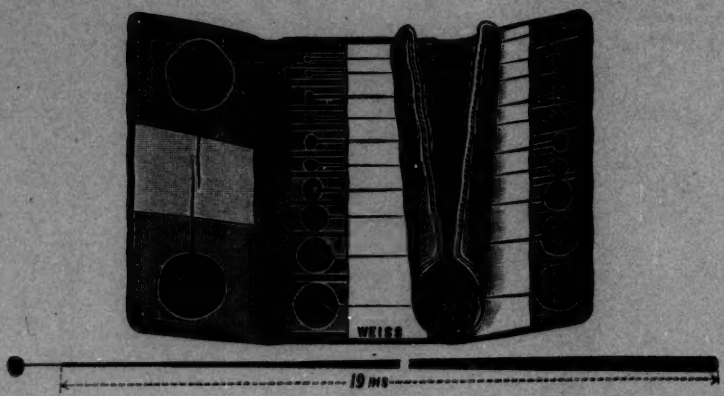

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BENJAMIN TRAVERS.

(1783—1858)

THE BRITISH JOURNAL
OF
OPHTHALMOLOGY.

MAY, 1917.

BRITISH MASTERS OF OPHTHALMOLOGY SERIES

2.—BENJAMIN TRAVERS, F.R.S.
(1783-1858)

BY
PERCY DUNN, F.R.C.S.,
LONDON.

BENJAMIN TRAVERS was one of the pioneers of ophthalmic surgery in England. He was one of the first general surgeons who combined with his work the study of eye diseases. The enterprise was a bold one, as we shall see. Thus does he describe the situation as it affected him. "In this country," he writes, "I believe no one before myself who designed to practise general surgery, ventured to give more than a cursory attention to the diseases of the eye. A fear of being disqualified in public opinion, by a reputation acquired in these, for the treatment of other diseases, was a motive, however groundless, sufficient to deter surgeons from the cultivation of a large and legitimate field of observation and practice."[1] And yet he did not act precipitately in coming to a decision. Just previously to the time that he avowed himself an ophthalmic surgeon, while practising as a general surgeon, there had appeared a strong pronouncement upon the subject by an authoritative writer, Samuel Cooper, the author of the then important work, "Cooper's Surgical Dictionary." Therein the opinion was expressed that "no one except the thorough surgeon can make the complete oculist: by which last term is not meant anybody who can merely manage to extract the cataract better than the generality of surgeons, but a man whose science leads him to recognise the analogy betwixt the diseases of the eye and those of other parts, and whose knowledge of the latter, while it qualifies him in a great measure for the treatment

of the former, gives him a decided superiority over the bare oculist." This statement casts a somewhat lurid light upon the practice of ophthalmology at the beginning of the nineteenth century. There were factors which explained it. First, eye surgery, such as it existed, was under a cloud, as the happy hunting ground of a horde of impostors, a gregarious class of quacks, who thought nothing of couching cataracts in market places. As a matter of fact, eye surgery was scarcely above the level of dentistry—then a debased and neglected department of medical practice. This may be gathered from the following poetical attempt[3] to gauge the situation:

"Yet they that very hardly
Teeth can draw,
Unless they spill much blood
Or break a jaw,
Will deal with eyes
And boast of famous acts
They have performed
In couching cataracts."

Furthermore, Queen Anne, to her discredit, had previously employed a quack oculist, whom she knighted. This quack—Sir William Read, as he became—was a cobbler, who could neither read nor write. Because, therefore, quacks had claimed a dominance in eye work, there was probably a feeling, that to a professional man, it was derogatory to be identified with such a discredited practice. Still, there were a few medical men who practised nothing else, and these labelled themselves oculists. But these oculists themselves were regarded askance by their professional *confrères*. The eye was held to be chiefly a "constitutional" organ, one of the diseases of which could not be properly understood, unless the practitioner possessed a fully equipped knowledge of disease generally. How, for example, could a "bare oculist" know the subtleties of the usefulness of calomel, the sheet anchor in the treatment of eye diseases, without the experience gained and fortified by the general practice of his profession? For these, and possibly other reasons, the study of ophthalmic surgery was deliberately and woefully neglected, as Travers records; as a speciality, it was discounted, the prejudice against it being based upon an illogical misconception, the harmfulness of which was only exceeded by that of the failure to realize the importance of the issues involved. It was this degraded attitude of the profession which Travers sought to combat, when as a general surgeon he took the bold step of identifying himself with ophthalmic work. Dispassionately viewing his decision, one must concede that he conferred a three-fold benefit, in which ophthalmic surgery, the profession, and the public respectively participated. Again, the step was a bold one, because of the risk he ran of compromising his professional position, and of bringing upon himself the disapprobation of his hospital colleagues.

Quite possibly had he held a less commanding position than he did as a surgeon, the risk might have materialised to his disadvantage; meanwhile, the fact remains, that even after seven years' work upon the staff of an ophthalmic hospital, he still deemed it necessary to offer further justification for the bold step he had taken. "But whether," he writes, "my example or my services have been in any degree instrumental in promoting so desirable an object as that of recalling to the notice of the profession at large the neglected subject of these [eye] diseases, is a matter of no public interest, and which I am content to leave to the candour of the profession." And, as if further to strengthen his case, he adds, "I entreat it may be understood that it is far from my meaning to insinuate the slightest derogation from the merits of some truly respectable members of the profession, who confine their attention to this class of [eye] diseases." [4]

Such was the position of eye surgery in 1810, when Travers was offered and accepted the post of surgeon to the London Infirmary for Diseases of the Eye. The vacancy on the staff was occasioned by the death of Saunders,* the founder of the Institution, an institution the reputation of which has since become world-wide as Moorfields Eye Hospital. For four years Travers discharged the duties of the appointment unaided. By means no doubt of his strenuous efforts, the hospital soon became an important teaching centre for students, many hundreds of whom, as he tells us, passed under his tuition. Apparently the work became greater than he could deal with without assistance. In 1814, therefore, a second surgeon was appointed, and, as he records, "Mr. William Lawrence became my colleague." [5] This appointment was evidently to Travers a source of much satisfaction. He worked with Lawrence for three years and then resigned, thus raising the latter to the senior post. In commenting upon this, he writes, "I consider it to be no ordinary sanction of my views that they were thus seconded by the co-operation of a gentleman, so highly distinguished, as the present senior surgeon of the institution." [6]

As was to have been expected, Travers wrote a book on his speciality. With the increased leisure, gained from some release of hospital work, he found the time to compile a volume on "A Synopsis of the Diseases of the Eye and their Treatment." The first edition appeared in 1820; a second in the following year; and, later, there was a third. The treatise, he tells us, is the record of his personal experience, and is not a compilation based upon the work of others. We may therefore accept it, so far as it goes, as a reflex of the practice of British ophthalmic surgery of his time. Space does not permit of more than a few

* A biography of J. C. Saunders was published in the *Royal London Ophthalmic Hospital Reports* of November, 1914.

brief references to some of the details of this work. Perhaps an outstanding feature is that throughout the volume, only once, and that incidentally, is mention made of glaucoma. There is reason for surprise at this, inasmuch as in the sixteenth century, glaucoma was described and recognised as a distinct disease under that name. The following passage may be quoted, as representing Travers's views upon the subject. Under the heading "organic amaurosis" we read "A diffused turbidity or milkiness, apparently of the vitreous humour, is strikingly observable when contrasted with the jetty blackness of a healthy eye. . . . This state, which the ancients called glaucoma, is very often mistaken for incipient cataract, and I have known it called a black cataract, and the operation of extracting the transparent lens performed. It appears deep-seated, diffused, and of uniform density, and in examining such cases at long intervals I have not found the appearances vary. The lens remains transparent. There are, however, some cases of a deep-seated opacity so closely resembling that of incipient cataract that it becomes next to impossible to decide the actual state of the lens. I have seen the latter, upon an experimental extraction, in such a case, semi-transparent and of a bright yellowish tint throughout, and the sight of the patient has been considerably improved. The vision is in general defective in a much greater degree than the visible opacity explains, and this combined with the depth of the opacity, a dilated, and sluggish pupil, and some other symptoms of amaurosis, makes for the opinion that it belongs to the latter class."[7] It is not without interest to quote Saunders, his predecessor at the London Infirmary, upon the same subject: "This organic disease, amaurosis, is very rapid in its progress, and produces blindness in the course of a few days. Even on the first application of the patient the loss of vision is often found to be total. The pupil is dilated, the lens protrudes, the convex iris seems to touch the cornea, the humours of the eye are turbid, dull, dim, especially the crystalline, which becomes tawny or quite opaque, the vessels of the sclera and conjunctiva are unusually large, and run in distinct clusters. The disease remains stationary, so far as I have observed, with occasional pains in the eye or head. This form of amaurosis is intractable."[8]

In this description it is observable that the term glaucoma—a term honoured by Hippocrates, and still doing duty in ophthalmic nomenclature—is not even mentioned. Such was the knowledge of this disease a hundred years ago. What will posterity, a hundred years hence, have to say of the literature of glaucoma in our time?

It would appear that the staff of the London Infirmary for Diseases of the Eye issued annual reports of the work carried on at the institution. This may be gathered from the fact that Travers on one occasion refers "to the last annual report," as containing

the record of a noteworthy case. Inquiries, however, at the libraries suggest that these reports have not been preserved; at least, if they had been, we should have expected that some copies would have filtered into the libraries for reference. The "singular case" to which Travers refers was that "of a hydatid cyst of the orbit, protruding the eye. The hydatids were evacuated by puncturing the cyst, the eye returned into its natural situation, and the patient was completely cured. This is the only instance of such an affection that has occurred since the opening of the Infirmary!"[9]

A curious reference to Milton occurs in this Synopsis. When our great epic poet determined, as a last resource, to seek for relief from his blindness, the aid of Thevenot, the French oculist, he wrote a full description of his symptoms. In respect to this Travers comments as follows, "I subjoin it as the best account that I know of the symptoms of amaurosis in its progress from the state of functional debility, to the confirmed, perhaps organic, *gutta serena*. I have preserved his own words for the sake of accuracy."[10] And he quotes the report, as Milton wrote it—in Latin. It may be surmised that this Latin dissertation could scarcely have proved informative, save to those medical students and practitioners who could claim to be classical scholars. Milton, however, as we know, left on record an ode, a word-picture of his symptoms, the details of which are in keeping with the suggestion that the cause of his blindness was chronic glaucoma. And yet another hypothesis has been advanced that his blindness was due to detachment of the retina.

There emerges from the perusal of the observations upon cataract the impression that Travers regarded the operation of extraction as soundly based and usually successful. This, in the pre-antiseptic days of his time, is worthy of note. He was an ardent advocate of an exclusive corneal section. "It is," he says, "a point of considerable importance that the section should be purely corneal." Again, he claims that "if the section be clean, situated between the pupillary edge and the margin of the cornea, or a little nearer to the latter, if it be of such extent as to allow of the perfectly easy escape of the lens, if the conjunctiva, the sclera, and especially the iris be untouched, and the capsule freely lacerated, without lesion of the vitreous capsule, then the operation is perfect."[11] Possibly the explanation of his confidence and success lay in the fact that in avoiding vascular structures he reduced to a minimum the risks of septic infection. Again, if the iris prolapsed after the operation, the prolapsed portion was snipped off, and the surface and edges of the wound were touched with the "caustic pencil," a procedure for further lessening the risk of sepsis. In making the section he always used a Beer's knife, preferring it to those introduced by Richter and Wenzel, which seem to have been mostly in vogue during his time. Nocturnal pain, after the operation, was always treated by a

"full blood-letting," and the bandage over the eye was dispensed with after the second or third day, a "deep-black shade" being substituted for it.

Travers has been largely quoted in ophthalmic literature in connection with his treatment of lacrymal obstruction. In his book he deals with it fully. A recent writer thus conveniently sums up the treatment. "Benjamin Travers, who was sceptical as to the utility of the gold cannula, which Dupuytren used so largely during his time, also employed probes, which he passed as Anel did, through the punctum and the canaliculus. His probes, however, were larger than those of Anel, and his results were therefore more satisfactory. He also employed slender styles with flat heads, gently sloped, which he introduced through the canaliculus, permitting them to remain in position for twenty-four hours only, because of their tendency to cause ulceration of the punctum."[12] But it is worthy of note that Travers had, in William Mackenzie, a contemporary who wholly disagreed with the probing treatment. "Anel, Travers, Jacob and others," writes Mackenzie, "have recommended that probes, and other means for removing the stricture, should be passed down from the puncta, through the sac, into the duct. Both these modes of practice have been found to be painful, dangerous and ineffectual. They not merely fail in the object intended, but are apt to end in incurable atony of the puncta, by causing them to split, or to ulcerate, and are, therefore, generally abandoned."[13]

Sufficient has probably now been said to emphasize the part which Travers played as an ophthalmic surgeon. There only remains, therefore, to be considered some brief references to his personal history, and to note the distinction he otherwise gained as a member of the profession.

He was born in Queen Street, Cheapside, in 1783, and was the second son, in a family of ten children, of parents who were wealthy. He was the first of Sir Astley Cooper's pupils and began his medical education in 1800, at the time of the appointment of Cooper to one of the surgeoncies at Guy's Hospital. His intimate connection, both as a pupil and socially, with his distinguished chief, had much to do with moulding Travers's subsequent career. The means by which he was first brought in contact with Cooper, illustrated a custom, which in those days more or less prevailed. It was a habit with laymen of industrious minds, desirous of adding to their knowledge, to attend the lectures of distinguished physicians and surgeons. A notable example of this was pointed out by Dr. Norman Moore, at the reading of my paper on Andreas Laurentius, before the Historical Section of the Royal Society of Medicine. Laurentius, as a professor of anatomy, used to have among the audience at his lectures, his Royal patron and friend, Henry IV of France. Similarly, Travers's father attended the

lectures given by Sir Astley Cooper, and was accompanied upon several occasions by Travers himself. Becoming attracted and impressed by the vista portrayed of a medical life, he determined to adopt medicine as his career, and his father being a wealthy city merchant, no doubt gladly negotiated the fee, usually a large one in such cases, to secure his pupillage with Cooper. In 1806, Travers became a member of the Royal College of Surgeons, and soon afterwards was appointed demonstrator of anatomy at Guy's Hospital, a post which he held for many years. Then came the vacancy on the staff at the London Infirmary for Diseases of the Eye. The appointment was first offered to Henry Cline, who refused it. Travers was invited to fill the post, with the result we have seen. At the age of thirty, in 1813, he was elected a Fellow of the Royal Society, and two years later, the honour of a unanimous appointment was conferred upon him, as one of the surgeons at St. Thomas's Hospital. In 1817 he resigned his post of surgeon to the London Infirmary for Diseases of the Eye, after seven years' service. By this time Travers had gained a conspicuous reputation as an oculist. In an obituary notice—Travers died on March 9th, 1858—a contemporary alludes to this. "The reputation already acquired by the subject of this notice for ophthalmic skill, was greatly enhanced by the publication in 1820 of his 'Synopsis of the Diseases of the Eye.' This volume is elegantly written, and the illustrations are of a superior order, far better, indeed, than those which have appeared in many more recent works." [14] It is plain that his *Synopsis* appealed to his contemporaries. In 1839, during Travers's lifetime, a eulogy appeared of it from Pettigrew. "This work," he writes, "was translated into Italian, and a New York edition of it was produced. It is an ably condensed system of ophthalmic surgery, and one of its great merits is that of being the result of the author's own observation, rather than a compilation from the work of others. The best proof of its value that can be afforded is that but few synopses have been more generally acknowledged by the profession." [15]

Of the contributions upon general surgical subjects which appeared under Travers's name it is not necessary here to speak. They were numerous, varied, and, in a progressive sense, valuable. A volume of surgical essays appeared, in collaboration with Sir Astley Cooper, his former chief. Travers' connection with the Royal College of Surgeons was long and distinguished, and only ceased with his death. He was elected a member of the Council in 1833; in 1838 he delivered the Hunterian Oration, a performance which was extolled for its excellence. He was twice President of the College, first in 1847, and, secondly, in 1856-1857, the year before he died. He was a Fellow for fifty years of the Royal Medical and Chirurgical Society, to the Presidential Chair of which

he was elected in 1827. Again, his position as a distinguished surgeon was recognised by the Court, Queen Victoria promoting him to the serjeant surgeoncy in 1857, an honour which, nine months later, was terminated by his death. Despite, however, the favour shown him by the Court, Travers, as we know, did not receive a title. In the early Victorian days science, as a whole, was not accounted worthy of encouragement in this regard. Many notable instances could be cited of scientific men receiving no titular reward as a State recognition of their distinguished services. Had, therefore, Travers lived in our day, his name, it is possible, would have passed down to posterity with a title, at least in some degree commensurate with his high position as a distinguished British surgeon.

In the following passage we gain a glimpse of Travers, as he appeared to his contemporaries: "He was tall, large-framed and well-proportioned, with a highly intelligent and pleasing countenance. His manners were prepossessing, and in consultation with his professional brethren he showed a high-bred courtesy which marked the refinement of his mind. He was ever popular, whether in the profession or out of it, and the announcement of his death will be received with heartfelt regret both at home and abroad."[16]

Travers was married three times and by these marriages had a numerous family. Only one son, his eldest, also called Benjamin, joined his father's profession—father and son established a record in the history of the College. Each was elected a Fellow of the College at the same time under the Honorary Rule, in 1843, when the new distinction was founded. Travers was buried, on March 12th, 1858, as recorded in a contemporary obituary notice "at the quiet little village of Hendon." For a long time this former "little village" has relinquished its rustic simplicity and rural quietude.

Benjamin Travers, junr., was for a short period resident Assistant Surgeon at St. Thomas's Hospital. Apart from this his career was uneventful, and he died in 1868, eleven years after his father's death.

And here our survey of the life of Travers may end. It is impossible to doubt that he embarked upon his ophthalmic work with a keenness, a spirit of enterprise, and a devotion to its demands, such as in his day must have rendered valuable aid in helping to purge the science of the slough of degradation which marred and arrested its progress. It is evident, too, that he brought to bear upon its practice those valuable surgical instincts of which he had proved himself to be the possessor as a general surgeon. With two such distinguished supporters as himself and Lawrence, the assumption is reasonable that probably a new era in ophthalmology came into being, with advantage to the profession, and greatly to the benefit of the public.

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COMMUNICATIONS.

BITEMPORAL HEMIOPIA: THE LATER STAGES AND THE SPECIAL FEATURES OF THE SCOTOMA.

With an examination of current theories of the mechanism of production of the field defects.

(Continued from p. 239.)

BY

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Anatomy.

Having now studied the typical form of the field changes and the way in which they develop, it is essential, before proceeding further, to review shortly the main points in connection with the normal anatomical relations of the chiasma to the adjacent structures, more especially to those which lie beneath it.

In many, even up-to-date, text-books, whether of anatomy or of ophthalmology, the chiasma is said to lie upon the optic groove of the sphenoid, all further details being permitted to remain in obscurity. This description is not based on actual observation and is completely imaginary. Only the anterior half of the chiasma could lie on the narrow optic groove; the posterior part would lie over the olivary eminence and the anterior edge of the sella Turcica. The angle between the two optic nerves would require to be practically equal to two right angles. The infundibulum would pass

vertically downwards or even downwards and backwards to the pituitary body, leaving a wide angle between its anterior surface and the inferior surface of the chiasma. Such conditions very seldom occur.

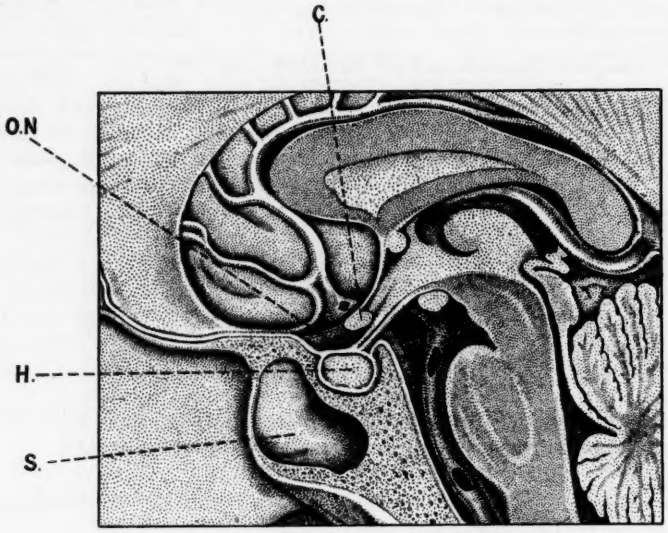

FIG. 26.—Anatomical Relations of the Pituitary Body.

C. Chiasma. O.N. Optic Nerve. H. Hypophysis. S. Sphenoidal Sinus.

The anatomical relations of these parts have been studied by Lawrence,[30] Fawcett,[14] Zander,[66] Hirsch,[29] Wallis,[60] and Cope,[6] and most of the essential points may be regarded as established. The optic groove was found by Zander in only 34 per cent. of skulls. Behind this lies the olivary eminence, which varies greatly in size and is very often poorly developed. The sphenoidal cells, when well developed, extend beneath the optic groove, olivary eminence, and sella Turcica. The dorsum sellæ, crowned by the posterior clinoid processes, bounds the sella Turcica behind, but the anterior margin of the latter is more variable and corresponds to the posterior margin of the olivary eminence. The diaphragma sellæ is a fold of dura mater which roofs in the sella. It is attached in front to the posterior margin of the olivary eminence, a band on each side passing to the lower edge of the optic foramen, and behind to, or immediately below, the crest of the dorsum sellæ.

In, or often slightly behind, the centre of the diaphragma is an opening through the posterior part of which the infundibulum passes. This opening, or foramen diaphragmatis, varies greatly in size and is

nearly always much too large for the infundibulum. It is filled in by a thin transparent membrane, through which the hypophysis is visible, and which may form almost the whole roof of the sella, the diaphragma itself being reduced to a mere rim. In such cases there would be practically no obstruction to the easy upward growth of an hypophyseal tumour. Thus the area under consideration extends from the limbus sphenoidalis in front to the dorsum sellæ behind and consists anteriorly of a thin bony wall of variable extent covering the sphenoidal cells and posteriorly of a membranous layer of varying thickness covering the pituitary body. Above these structures lie the optic nerves and chiasma. While the plane of the area described is approximately horizontal, or sloping a little downwards posteriorly, that of the optic nerves and chiasma inclines slightly upwards behind, so that the back of the chiasma lies at a somewhat higher level than the optic foramina, and the space between the chiasma and the subjacent structure increases from before backwards.

The intracranial part of the optic nerve varies greatly in length from 4 mm. to as much as 21 mm., averaging 13 mm. (Zander). The position and relations of the chiasma obviously depend to an important degree upon this factor, as the shorter the nerves are the more relatively anterior will be the chiasma and *vice versâ*. The angle between the optic nerves is usually more or less acute, quite unlike the very obtuse angle so often shown in illustrations and diagrams, and it is only in cases where the intracranial optic nerves are unusually short that this angle becomes wide and the chiasma therefore occupies a forward position. In such cases, which are not common, a well developed olivary eminence is beneath and possibly in contact* with the anterior border of the chiasma. In eleven subjects Wallis[60] observed one case in which more than one-half of the chiasma lay upon the optic sulcus and the olivary eminence. Judging by the findings of others, the proportion of such cases must be much less than one to eleven.

If the chiasma with the apex of the third ventricle be left *in situ* after removal of the rest of the brain and viewed from above, a wedge-shaped portion of the diaphragma sellæ, extending backwards to the extent of a third or a half, or even more of its antero-posterior diameter, will usually be seen in the angle between the optic nerves and frequently also a portion of the foramen diaphragmatis. Thus the chiasma lies well behind and above the usually described position. Its posterior edge projects behind the level of the dorsum sellæ to an average of 1.58 mm. (Zander) and is very rarely found in front of this point. A large subarachnoid space lies

* It must be remembered that the true height of the chiasma above the subjacent structures cannot be ascertained when the skull is opened in the ordinary way, even by removing the brain piecemeal.

beneath the chiasma, and the vertical distance between its lower surface and the diaphragma sellæ is as much as 5 mm. to 10 mm., according to different observers.

The writers mentioned pay scant attention to the position of the infundibulum. This structure, as is well known, resembles a much elongated funnel, being thin at its termination and considerably thicker where it leaves the third ventricle. At this point it lies behind the level of the dorsum sellæ, over which it passes in a forward and downward direction. Immediately beyond its commencement it is in contact with the centre of the lower and posterior surface of the chiasma. As it arches over the dorsum sellæ, its direction is almost parallel to the plane of the chiasma. In front of the dorsum sellæ it is directed more downwards, leaving the chiasma at a very acute angle, and passes to the posterior edge of the foramen diaphragmatis keeping close to the dura covering the dorsum sellæ.

It is important to remember that it is the infundibulum and not the hypophysis which is in immediate contact with the chiasma. Thus a commencing primarily infundibular tumour or a thickened and congested infundibulum pressed upwards by a subjacent hypophyseal enlargement would impinge directly upon the mid-line of the under surface of the chiasma and might exert an approximately central longitudinal pressure at a comparatively early stage. Apart from producing actual pressure, the infundibulum is so vascular, and so closely bound to the lower surface of the chiasma by the pia mater that any congestive or irritative condition in it might easily be communicated to the chiasma.

The pia mater stretches across between the optic nerves like an apron and is closely adherent to their lower surfaces. At the sides it is attached to the carotid arteries and behind to the anterior border of the chiasma and to the infundibulum which it closely surrounds. Delicate connections pass between the pia and the dura over the roof of the cavernous sinus and over the dorsum sellæ. In front of the infundibulum and anterior border of the chiasma, over the diaphragma sellæ and the sphenoid, there is a free space, apparently without connecting filaments.

The relation of the chiasma to the circle of Willis is of some importance in that the anterior communicating artery lies across the two optic nerves. When the chiasma is forced upwards by a tumour, the optic nerves are compressed between the vessels, usually the beginning of the anterior cerebrals, and the tumour. This point is referred to by Uhthoff[54] and others, especially by Hirsch.[29] Bartels[2] states that if the constriction is slight and slowly developed, direct damage to the nerve need not result.

Another pathological anatomical feature is the indentation of the optic nerve at the entrance to the optic foramen when the chiasma

is pressed upwards. This condition is referred to by Walker and Cushing[59] and by Uhthoff[54] who, however, failed to find any true constriction of the nerve at this point.

Relation of field defects to cause.

In attempting to study the relation of the field defects to the underlying causal condition little help is to be obtained from the literature. While bitemporal hemiopia due to tumours in the neighbourhood of the chiasma has been studied by Cushing and Walker and others, I have failed to find any report in which the field changes, in cases due to a variety of causes, have been critically compared. Apart from tumours, tabes has been mentioned by Fuchs[19], whose findings have already been referred to. As far as the tabes is concerned Fuchs's view has been strongly opposed, and on apparently sound grounds, by Langenbeck.[84] Uhthoff[54] found that in brain syphilis the chiasma was a favourite site for gummatous processes and gives three typical fields of vision, one of which especially shows the retention of the upper-inner quadrant. Bogatsch[5] gives an analysis of 315 cases of which 50 per cent. were due to proved or suspected tumours, 11 per cent. to syphilis, 1 per cent. to tubercle, 20 per cent. to various causes, while 18 per cent. were without ætiological indications. Only one case was due to post-nasal sinus disease, but others have been mentioned by Glegg and Hay,[23] Jameson Evans,[13] Grönholm,[26] and Wallis.[62] Case No. III in my series was probably due to this cause, although the right antrum only was proved to be affected, and case No. XX was of similar nature. In regard to case No. XIX in which the only diagnosis was cervical tuberculosis, Bogatsch mentions three cases as due to tubercle. Fleischer[16] mentions a case of tuberculous tumour of the cerebellum with optic neuritis, blindness, and enlargement of the sella Turcica, but the presence of bitemporal hemiopia is not definitely stated. Pituitary tuberculosis is referred to by Uhthoff[54] as a rarity. Unfortunately the frequent absence of perimetric records and the lack of uniformity in method and detail in regard to such perimetry as has been done has greatly reduced the value, for our present purposes, of the greater part of the observations which have been recorded. In the present series of 22 cases, in three, or about fourteen per cent., the cause was undiagnosed, a figure which closely corresponds with the eighteen per cent. found by Bogatsch.

If we now review the pathological conditions in these 22 cases we find that acromegaly was present in nine (Nos. I, II, IV, V, VI, VIII, IX, XIII, XXIII) and absent in 13. Group I contains two acromegalies (IX, XXIII), one infantilism (XXIV), and three cases with X-ray signs of tumour (XIV, XV, XXI). One case (X) showed a large tumour *post-mortem*, one (XIX) had cervical tuberculosis, and

one was undiagnosed (XVIII). The remaining case, No. XII, was probably syphilitic, as it responded rapidly to mercury and iodide.

Group II includes two acromegalies (I, V), one case of suppurating maxillary sinus (III), one of syphilis (XXII) judging by the history and the result of treatment, and two (VII, XI) for which no cause was ascertained.

Group III contains five chronic acromegalies (II, IV, VI, VIII, XIII) and one case (XVI) of doubtful ætiology, either tumour or syphilis, probably the former. It may be noted that in all cases of acromegaly field changes were found.

Group IV includes one undiagnosed case (XVII) and one of well-marked syphilis with nasal sinus involvement (XX).

Scotomata.

As already mentioned, there were ten cases with scotomata (Nos. I, III, VII, IX, XI, XII, XV, XVI, XIX, XXII) and several others (*e.g.*, XIV, XXIII) had probably had scotomata, although they were not observed at the time of examination. Scotomata were not found in the very chronic acromegalies, all the cases in which they occurred being of a relatively active type; that is to say, the history of visual defect was comparatively short and the fields were in a more or less fluid state, showing changes from time to time. This bears out the view put forward in my previous paper that these scotomata are usually associated with relatively greater activity of the lesion, such as is present in active pituitary tumours or in inflammatory conditions, than occurs in the more slowly moving lesions, such as the very chronic forms of hypophyseal enlargement. The five cases in which scotomata showed typical features were due: one to acromegaly (I), one to antral suppuration (III), one to syphilis (XXII), and two were undiagnosed (VII, XI). The other five were due: one to acromegaly (IX), one to syphilis (XII), one to tumour (XV), one to either tumour or syphilis (XVI), and one to cervical tubercle (XIX). There is therefore no special ætiological relationship as far as the form of the scotoma is concerned.

The ring scotoma in Case IX (p. 229) is of sufficient interest to merit a more detailed discussion. From Fig. 8 it is apparent that a fairly wide bundle of fibres both upwards and downwards is affected and that the number of fibres involved is greater towards the centre of the bundle. Also the fibres concerned are only affected in so far as they belong to the crossed fasciculus, the defect stopping sharply at the area of the uncrossed fasciculus. In bitemporal hemiopia the occurrence of a half ring scotoma has been seldom described. Rönne[41] illustrates a quadrant ring scotoma; and Fuchs,[19] using Bjerrum's method, found a hemiopic ring scotoma foreshadowing bitemporal hemiopia in cases which he considered to be tabetic

atrophy. A scotoma of this nature but without the straight vertical mesial boundary is figured by Cushing and Walker[9] (Figs. 45-47). It occurred in a child of fourteen with hypopituitarism and "a large irregular calcareous tumour wrapped around chiasm." Explanations have been attempted by Gallus[22], who attributes this form of defect to retrobulbar neuritis affecting the optic nerve between the chiasma and the outer end of the optic canal, and by Marx[37], who suggests the same condition affecting the nerves between its commencement and the entrance of the central vessels. While it seems quite probable that some form of retrobulbar neuritis is concerned, both of these explanations are theoretical and do not take into account the occurrence of the hemiopic ring scotoma. Whatever the cause may be, it is evidently not dependent on anatomical conditions, such as close confinement by unyielding bony walls, which are limited to a particular portion of the nerve, but may also act further back where the conditions are quite different. The escape of the usually so easily affected macular fibres presents an interesting and hitherto unsolved problem.

Radiography.

Fourteen of the 22 cases were X-rayed and also the 2 extra cases; 3 of the 6 cases with early field changes were X-rayed and gave positive results; 2 were acromegalies (Nos. II, VIII) and showed slight enlargement and deepening of the sella, the third (XVI), with only visual symptoms, showed expansion of the sella with erosion of the clinoids. Eight of the ten advanced cases were examined, 6 giving positive results: 2 acromegalies (IX, XXIII), 1 infantilism (XXV), and 1 undiagnosed case (XXI) had enlargement of the sella to a greater or less extent; and 2 (XIV, XV), with only visual symptoms, had extensive flattening of the sellar area with erosion of the clinoids. In this connection it is of interest to note that Hirsch and Frankl-Hochwart[17] have found that tumours in this region may be very large without producing any symptoms other than visual-field changes and some drowsiness and lassitude. This was exactly the case in Nos. XIV and XV in which tumour was suspected, and also in No. XVI, in which, however, considerable benefit resulted from iodide and mercury. The 2 cases with normal sellæ include 1 (XVIII) undiagnosed, and 1 (XIX) with cervical tubercle. Fearnsides[15] has noted that suprasellar tumours, unless they are large, may cause no sellar deformity, while Gilbert Scott[49] states that in acromegaly there may be practically no alteration. These observations, together with that of Hirsch and Frankl-Hochwart, may explain some of the difficulties of diagnosis. In the 6 cases with typical scotomata or central changes and relatively early peripheral field defects sellar deformation to any great extent would *a priori* not be expected. Unfortunately only three of these were X-rayed;

one (No. I) had acromegaly and sellar enlargement, the other two (III, XXII), with antral suppuration and syphilis respectively, had normal sellæ. Four of the five other scotomatous cases (IX, XII, XV, XIV, XIX), as already described in other groups, were X-rayed and positive results were found in three (IX, XV,XVI). Case XII was not examined and Case XIX was negative. Both the extra cases (XVII and XX) were examined with negative results.

It is well to bear in mind, when interpreting skiagrams of suspected hypophyseal or infundibular tumour that deformation of the sella with absorption of the posterior clinoids has been shown by Heuer and Dandy[28] to be by no means certain evidence of a local lesion, but a common general pressure phenomenon, especially in cases of cerebellar tumour. The trabecular or honeycomb-like shadow occasionally seen in the neighbourhood of the sella Turcica in transverse radiograms of the skull is due to the presence of aircells in the cellular or pneumatic type of temporal bone, which from one cause or another have been in the path of the rays passing through the sella when the photograph was taken. This shadow is sometimes mistaken for evidence of a pathological condition.

The most striking feature of this analysis is the great variety of conditions which may be associated with the same type of changes in the fields. It has been shown that the perimetric defect in the majority of cases travels round the centre of the field clockwise in the right eye and counter-clockwise in the left, and that this occurs whether the defect is chiefly peripheral or central or when both forms progress together. This type of field change occurs whether the primary condition is a mere enlargement of the hypophysis as in the usual form of acromegaly, still within the bounds, although these may be somewhat expanded, of the sella Turcica, or an unconfined and more extensively spreading tumour in the chiasmal neighbourhood, excepting, of course, laterally placed tumours, which produce homonymous hemiopia. In post-nasal sinus disease, in lues basilaris, and in other conditions the same type of field also occurs. It may be noted that pronounced sellar deformity is practically always associated with marked field defects, though the converse is by no means true. Beyond the association of scotomata with the more active cases and the severity of the field changes due to large tumours, there appears to be almost no relationship between the nature of the causal lesion and the type of field defect produced.

Where there is severe and lasting disturbance in the fields, with sellar deformation, a tumour of considerable size may be suspected, even in the absence of other symptoms of intracranial growth. In scotomatous cases in which the field changes vary rapidly from week to week or even from day to day, where central vision is relatively severely affected in association with a normal sella Turcica,

an inflammatory condition, such as nasal sinus disease or lues basilaris, should be thought of.

Mechanism of production of the field defects.

We are now faced with the interesting and difficult question :— How are these field changes brought about ? It is obvious that, as the same type of field change may be associated with different pathological conditions, any consideration as to the mode of production of these changes must take into account all known causal conditions and must therefore be based upon a study of bitemporal hemiopia in general. The search for the necessary common factor must not be limited to an examination of bitemporal hemiopias produced by any one form of lesion.

Three theories have been advanced, depending on pressure, traction, and local intoxication respectively, and we may now proceed to examine them in the light of our present clinical and anatomical observations.

Pressure.

Up to the present, consideration of this subject has been based mainly, if not entirely, upon a study of tumour cases, and thus great importance, perhaps too much importance, has been attributed to pressure upon the chiasma. It is hardly necessary to mention that tumours interfere with the function of nerve fibres upon which they press and it is well known that a laterally placed tumour in the chiasmal region produces homonymous hemiopia, as might be expected. A strong argument is furnished by the well-known beneficial effects of operative interference. The favourable result of operation, repeated, if necessary, several times, is well shown by the cases recorded by Hirsch, Cushing, and others. In several cases repeated evacuation of a cyst caused improvement in the visual symptoms on each occasion and in many the removal of a piece of tumour from the sella, varying in size from a cherry or hazel nut downwards, produced benefit, sometimes so great and so lasting as almost to be a cure.

An apparent difficulty is created by the fact that the upper surface of the pituitary tumour is rounded and relatively broad and can hardly exert a limited antero-posterior "knife-edge" pressure upon the chiasma such as might be considered requisite to produce the very definite and clean-cut defects often found in the fields. A thorough examination with serial test objects will show that in most cases these defects are not so clearly defined as might be supposed, a feature which is in agreement with the diffuseness of the degeneration picture observed by Walker and Cushing[59] in cross sections of the nerve fibres. It must be remembered, too, that by no means all of the nerve fibres are destroyed which subserve

an area which has lost all perception of light even for a considerable period, and thus a sharply demarcated field defect, which is the expression of a purely subjective functional test, need not necessarily be represented by a corresponding area of degenerated fibres. Within certain functional limits, however, the field defects are often quite clearly defined and it would appear that an antero-posterior "knife-edge" pressure upon the chiasma is not *necessary to produce apparently* clean-cut bitemporal hemiopic fields. Circumstances which may favour this are that at the lower and posterior part of the chiasma, the part upon which the tumour usually first impinges (Bartels[2]), only crossed fibres are present (Wilbrand and Saenger[64]), and also the close relationship of the infundibulum to this part of the chiasma. Uhthoff[54], who has specially studied the effects of hypophyseal tumours on vision, writes emphatically in favour of the action of direct pressure, and states that the exceptional occurrence of indirect effects may be disregarded.

There are, however, difficulties to be overcome before mechanical pressure effects can be accepted as a satisfactory explanation. Amongst these the following are prominent:

(a) The great deformation which the chiasma and its connections may undergo without the production of much perimetric change.

(b) The frequent difficulty of connecting the anatomical relationship of the tumour to the chiasma with the field changes present.

(c) The existence of a standard type of field change common to bitemporal hemiopias arising from a large variety of causes.

(d) The preponderance in some cases of central over peripheral defects.

(a) Uhthoff[56] himself writes: "Undoubtedly occasionally a non-malignant hypophysis tumour may last for many years without even causing any visual disturbance." An excellent stereoscopic picture is given of such a case in which it is obvious that the chiasma is raised upwards by the tumour, which completely fills the space between the optic nerves. Again, in relation to slow-growing non-malignant tumours: "the chiasma and basal optic tract may suffer severe compression before they fall a prey to degeneration." What is more, severe pressure apparently need not interfere even with the function of the nerve fibres. Cushing and Walker[9] say: "It may be gathered, therefore, that the chiasmal 'cross roads' are capable of considerable distortion by a growth in the interpeduncular space without a demonstrable encroachment upon the field of vision. This, moreover, has been demonstrated in a few cases in which supposedly normal fields were plotted shortly before death and yet in which an extraordinary degree of deformation and elongation of the chiasma was disclosed *post-mortem*." Thus, although the "supposedly normal" fields would probably have

disclosed defects to a thorough application of the quantitative method of perimetry, it is evident that great distortion of the chiasma and tracts may occur with, at any rate, very little field change. Hirsch's[20] experience has led him to believe that in tumour cases severe visual symptoms indicate intracranial extension of the growth, so that while bad vision is a sign of relatively large tumour, good vision is no contra-indication.

(b) Cushing and Walker have found that, "contrary to expectation," the perimetric defect with suprasellar tumours does not usually begin in the lower quadrants but often follows the typical stages. It may be remarked here that there is no reason to suppose that a suprasellar tumour presses first upon the upper surface of the chiasma. The same authors refer to a field of vision, in which the upper-inner quadrants alone remained, as a "bizarre type" and attribute it to the growth having burst from its dural coverings, enveloping the chiasma and the optic nerves in an irregular way. It has, however, been shown above that this form of field, far from being unusual, is a typical feature of bitemporal hemiopia and occurs quite independently of tumours, whether encapsuled and confined or not, and that this type of defect may be present in some cases at a relatively early stage in the development of the field changes. Case 7 of Hirsch's series is of great interest, as it is an example of an extremely rare field condition —symmetrical retention of the two third quadrants only. A large growth was found *post-mortem* over which the chiasma lay extended, while the optic nerves were deeply indented by the origins of the anterior cerebral arteries. The tracts were much compressed and, together with the nerves, are described as atrophic, though it is not specified whether a microscopic examination had been undertaken. Such conditions as these are by no means rare, and yet in this case the resulting fields were most uncommon. Wilbrand[62] mentions the possibility of such fields, but had not seen a case, and in an extensive examination of the literature I have not found another. As far as concerns symmetrical terminations, this form must be enormously rarer than retention of both upper-nasal quadrants.

In the succeeding case (No. 8) an uncommon condition was present also, for here the tumour had grown up in front of and on top of the chiasma, which was apparently displaced upwards and backwards. The chief incidence of interference would here appear to be upon the upper surface of the chiasma. The fields showed bitemporal hemiopia with a small scotoma at the apex of each first quadrant and a slightly greater failure of the second than of the first quadrant, especially on the left side. This is to some extent what might be expected from a dorsal interference, only that the scotoma should have been in the second quadrants also.

As far as the effect on the chiasmal nerve fibres is concerned, the size of the tumour and, apart from laterally placed tumours, its position, whether originally intrasellar or suprasellar, appear to have less influence than might be expected, though a difficulty of this kind is in all probability largely due to our ignorance of the exact conditions.

(c) We have already seen that the type of field change with retention of the fourth quadrants may be associated with very different causal conditions. While quantitative differences may be present, the fields are qualitatively of the same type from the beginning, whether a tumour is present or not, and whether the tumour is small or large, intra- or suprasellar. The occurrence of the typical field changes in cases where there is no tumour, as in nasal sinus disease and basal syphilitic conditions, forms one of the most serious objections to the mechanical pressure theory, and suggests that the field changes may depend upon some other factor, which is common to all causes of bitemporal hemiopia.

(d) In a fairly large group of cases (Group II) central field defects predominate, and the fields resemble those of retro-bulbar neuritis. Were mechanical pressure the main cause, it would seem natural that the peripheral fibres, being those first pressed upon, would first show signs of interference. This group of cases is also characterised by a predominance of inflammatory conditions over tumours, although actively growing tumours, which of course may be expected to produce the most marked pressure effects, also cause fields of the scotomatous or neuritic type. In either case the same typical development of the fields occurs, so that further support is afforded to the conclusion that not pressure, but a factor common to inflammatory cases and actively growing tumours is the real cause. The last two objections are the most cogent, and have, so far as I am aware, not yet been taken into consideration by the advocates of mechanical pressure.

In cases such as chronic acromegaly, also, where the tumour is very slow growing, central changes of non-scotomatous type occur with very slight, if any, peripheral field change (Fig. 27). It is open to question whether the sensitiveness of the chiasma is such that the slow gentle pressure, or, more likely, mere contact of an early pituitary enlargement, can mechanically produce changes in conductivity which affect the chiasmal fibres right through to the deeper layers. These field changes rather suggest that the fibres are spread out into flat bands, but even so the peripheral fibres should still suffer most and soonest.

Influence has been ascribed to sudden pressure, and to pressure due to the varying blood content of a very vascular tumour. Such suggestions are simply variants of the ordinary pressure theory; both postulate a tumour sufficiently large to protrude

nearly a centimeter above the normal level of the diaphragma, and both are compatible with the rapid appearance of local vascular and cellular disturbance, which in themselves may be factors of importance. In certain cases, and at certain stages, usually in

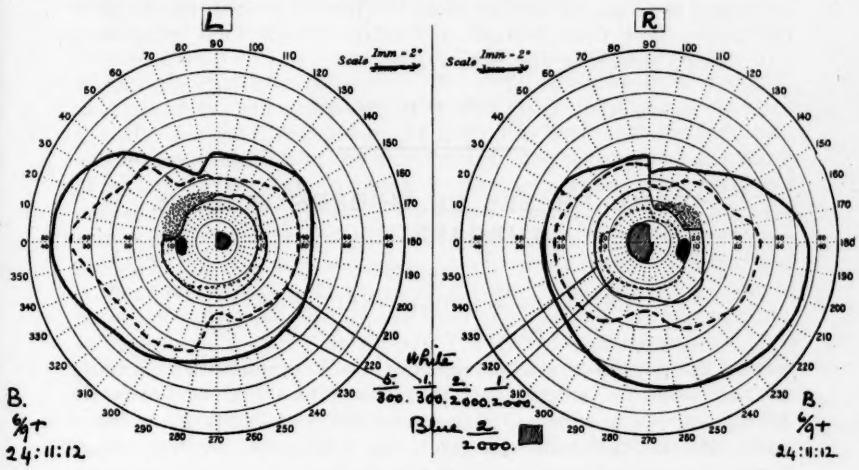

FIG 27.

Early perimetric signs of bitemporal hemiopia. From a case of acromegaly of about two years' duration. Note the character of the defect as the central field is examined with increasingly delicate tests. The dott-d area indicates faint perception of 2/2000 white. Complete central hemiopia for 2/2000 blue, with almost normal peripheral fields.

the later stages, such forms of pressure very probably come into play and produce variations in the course of the field changes. They can hardly be the cause of the typical defects.

Traction.

Since pressure fails to supply a satisfactory explanation of many of the perimetric findings, traction was suggested by Fisher,[45] and he has been supported by Fleischer [16] and by Walker and Cushing.[59] It is conceivable that a large tumour growing between the tracts and below the chiasma, might so stretch the nerve fibres as to cause functional interference. In favour of traction we have only the objections to pressure, and most, if not all, of these apply also to traction. The main difficulty is that traction can only, but apparently need not, result from a large tumour, whereas the field changes commence in their typical form from the beginning. It is also difficult to conceive how traction can cause hemiopic quadrant scotomata with little interference with the peripheral fields.

In connection with both pressure and traction it is evident, from

the anatomical relations of the parts, that before either, and especially the latter, can take effect an enlargement of the hypophysis must already project some distance above the normal level of the diaphragma sellæ, according to Hirsch, at least 7.5 mm. and, according to Cope, 10 mm. or more. There is no evidence to show that the earliest field changes are delayed until such dimensions have been attained by the tumour.

(To be concluded.)

SOME PHASES OF MODERN OCULAR THERAPEUTICS.*

BY

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SINCE the days of the Ptolemies, the medical man with his healing art has been an integral part of civilization. For centuries the human race was satisfied with mysticism and occultism. But a more dignified position was given the healing art by the ancient Greeks, among whom there were three schools or sects in medicine. First: the empirics who insisted that experiment was the prime requisite. Second: the methodists who fell back upon theory. Third: the dogmatists who took middle ground.

In more recent times, experiment and experience have been relied upon as essentials in medicine, and especially that part of it which concerns therapeutics. We all concede that an ounce of prevention is worth a pound of cure. But human life is so inextricably bound up with what Samuel D. Risley has happily called "the physiologic vices" of civilization that preventive medicine, with all its boasted achievements, affords little prospect of doing away with the healing art, at least in our day and generation. So that the cure of disease is still our sacred function. Except we heal our patients, our science and art is in vain. We are become as sounding brass and tinkling cymbals. If we cannot prevent, we must cure the ills that flesh is heir to. Therapy, therefore, must and will remain the supreme effort in combating disease.

The empirical nature of nearly all of our best methods and remedies has been often recognised, and even to-day it is surprising to what an extent we still depend upon what can be credited to empiricism and this alone. I would not for a moment disparage scientific medicine nor the desire to place all medical knowledge

*Address delivered by invitation before the New England Ophthalmological Society, December 7th, 1915.

on a sound scientific basis. But to wait until a remedy or measure is scientifically established before taking advantage of the benefits that experience or observation have taught us to expect from its use, is not only unjust to our patients, but is a violation of that humanity which is the tap root of our art and profession.

The word "incurable" should be the most dreadful of nightmares to a medical man ; and even the utmost pessimist among us must grudgingly admit his conviction that eventually the most redoubtable diseases will little by little find their prophylaxis or their remedy. Calomel, that gift of the gods, has been used for centuries, and even yet the laboratory workers have not told us its exact mode of action. Pilocarpin has been known as a general lymphagogue and eliminant for forty years, but only in the last five years have the serologists offered an explanation of its action that really explains. And so I plead for the open mind, that without haste and without rest is willing to prove all things. The consulting-room of each and everyone of us becomes a laboratory of experimental therapeutics if the observations there made are controlled and properly interpreted. And if perchance there should arise a conflict in testimony between the test-tube result in the laboratory and the results of carefully conducted therapeutic tests in the consulting-room or clinic, my voice would be raised in favour of the latter until such time as the results can be harmonized. For not always are the biologic conditions that obtain in the eye faithfully duplicated in the test-tube. Hence, the wisdom of reserving final judgment until the academic and the actual can be made to fit into each other.

It is a far cry from the atropine, silver, and mercury of the days of von Arlt to the embarrassment of therapeutic riches that encompasses us on every hand to-day. It may be well, therefore, to review, to take stock, as it were, of our armamentarium, and to learn, if so be, which are our most valued weapons.

With these brief words of introduction I shall proceed to the main topic of our discussion, and shall analyze certain phases of ocular therapeutics according as they are employed for (1) local use in the eye only, and (2) as a combination of general and local measures.

Local remedies and measures.

From 1833, when Geiger succeeded in extracting atropine from the *Solanaceæ*, this alkaloid was supreme in the domain of ophthalmology for 50 years. That it was abused goes without saying ; indeed, many an ophthalmologist's title was based on no more substantial foundation than that he employed atropine in his practice. In 1885, Koller introduced cocain, to be followed by its congeners, eucain, beta-eucain, holocain, novocain, stovain, alypin,

acoin, and a host of others, each with its own particular champion. Of them all, cocain still seems supreme as the anæsthetic of election in major ophthalmic surgery. Unfortunately, because of its loose chemical constitution, it cannot be boiled without losing much of its prized anæsthetic properties, and certain well-known authorities have therefore renounced it in favour of holocain or novocain, both of which may be boiled in solution, and thus sterilized, without impairing their special properties. Holocain, however, deserves more than passing notice, because of its beneficent influence upon all stages of corneal ulcer, a point that is not always sufficiently taken advantage of.

Not least among the synthetics with which organic chemistry has flooded us is dionin. It is almost gratuitous to observe that there has been much conflict of opinion as to the value of this drug. My own experience is that it is of signal service in promoting the absorption of post-operative *débris*. That it distends the conjunctival lymphatics from 5 to 10 times their normal dimensions seems reasonably well proven, and this may serve to explain its helpful action in iritis and uveitis. Also, as I pointed out ten years ago, in those rare cases of iritis glaucomatosa (Goldzieher) which present sooner or later to all of us, it is the ideal therapeutic "straddle." It is the one drug that seems equally efficacious in either iritis or glaucoma, and in its own domain stands alone. We should consider our own treatment case incomplete without it.

Next among the synthetics must be mentioned the various combinations of protein with silver, the so-called organic silvers. Whether one is wedded to protargol, argyrol, argentos, collargol, argentamin, largin, silvol, or whatever other preparation may be mentioned, matters little. The outstanding fact is that inorganic nitrate has been largely displaced by the organic silvers, and justly so. In acute infections of the anterior ocular segment their efficacy is beyond dispute, if only the precaution is observed never to continue their use over two or, at the most, three weeks. I am strongly of the belief that more argyrosis can be laid at the door of the organic silvers than ever obtained with the nitrate in its palmiest days. Albeit, we have finally elected argyrol as the least irritant of them all. For eight years, following the suggestion of Henry Dickson Bruns, of New Orleans, it has been our invariable practice to introduce argyrol in 25 per cent. solution into the conjunctival sac just before closing the eye after all major operations, and in that time we have had but one purulent post-operative infection. It is also used at each subsequent dressing, for at least ten days to two weeks. We concede that many other operators have achieved quite as fine results without resorting to this agent, but this in nowise disturbs the confidence we repose in argyrol as a preventive of post-operative infection. Not least among the advantages of this

method is the beautifully dry eye, free from any secretion, that is found each time the eye is redressed. In the ophthalmias, specific and non-specific, we lean very heavily upon 25 to 40 per cent. solution of this agent, although the inorganic nitrate is still a sovereign agent, when properly used.

Of most recent introduction is the new cinchona derivative, ethyl-hydro-cuprein, or "optochin," if the shorter trade name is preferred. In pneumococcus infections of the conjunctiva and cornea this new synthetic gives much promise. In the conjunctival affections its action is prompt and lasting, although too much insistence cannot be laid upon the imperative necessity of fresh solutions. Not more than a 24 or at the most 48 hour supply should be ordered at one time, for like all the photo-chemical synthetics, it deteriorates rapidly. In the few corneal cases that we have studied its action, it has seemed of service.

There is another field in which it may play no inconsiderable part, namely, as an anæsthetic. Like acoin, it exerts a much more anæsthetic effect when introduced subconjunctivally, and if the French reports are borne out, the anæsthesia should be of 8 to 12 hours' duration. This would be ideal in muscular operations as done under local anæsthæsia, for if the parts can be kept anæsthetic for twelve hours after the operation, it will much assist the quiet that is so essential after advancement operations. I have used it this way in but one advancement operation, and the anæsthesia endured for the best part of 24 hours afterwards. Not more than ½ per cent. solutions should be used subconjunctivally, as it seems disposed to favour sloughing in stronger solutions.

Subconjunctival injections.

Local therapeusis is now the order of the day, not alone in ophthalmology but in all the branches of medicine. Whenever it is possible to strike at a morbid focus of disease, the surgeon lays claim to a considerable share in the treatment of maladies once supposed to belong exclusively to the domain of medicine. Darier has well said, "Whenever a primary or secondary affection is localised in an organ as important as the eye, it becomes of the greatest consequence to prevent and extinguish the infection locally if possible without losing sight of the general indications. Now the eye lends itself beautifully to local therapeutics because of the arrangement of its lymphatic system which is made up of spaces communicating readily with one another." On this basis we can explain the favourable action of normal saline solutions given by subconjunctival injection. To promote absorption of recent corneal opacities, to stimulate absorption of vitreous opacities, also deposits upon the anterior capsule in the later stages of uveitis, we would award it a high place. All told, we have made

at least 1,000 such injections with various therapeutic ends in view without observing any untoward results. A few scattered cases of glaucoma have come to report alleged to have resulted from subconjunctival injections of normal saline solutions, but their number is negligible. Moreover, they may have occurred because the injection was not done as near the equator of the eyeball as possible. As Darier as shown, this is essential. For detachment of the retina we know of no measure as promising of results. We have now under observation a 55 year old man with spontaneous bilateral detachment, who 15 months ago had vision of 1/200 in his best eye. Injections of saline solution, running up to 10 per cent. strength, have been made three to four times monthly during the 15 months and to-day his vision in that eye is 6/12. For six months he has been going about actively every day. One such result in so dismally hopeless a disease as retinal detachment will outbalance a whole volume of negative records. Citrate of soda solutions have not afforded me entire satisfaction. To combat ocular infections, injections of 1 to 1,000 solutions of bichloride of mercury have proven their worth. In my service at the Philadelphia General Hospital we have a large number of hypopyon-ulcers of the cornea to deal with. Invariably they are treated with 1 to 1,000 solution of bichloride subconjunctivally and the results far outrun any others we have witnessed. Occasionally a second injection is necessary but not often.

Oxycyanide of mercury solutions need greater dilution, 1 to 5,000 to 1 to 8,000 solutions being preferred. This solution we have reserved for choroidal lesions, and we can attest its worth in such lesions, if recent and not due to tuberculosis. It is well in such injections to resort first to the customary cocain anæsthesia (four instillations of a 4 per cent. solution) followed by three to four minims of 1 per cent. acoin solution ; five minutes after which 15 to 20 minims of the mercurial agent are introduced. Serum gelatine acoin (prepared by M. Peliolle, a pharmacist, of Poste St. Denis, Paris) has proven most acceptable for this purpose. To sum up this phase of the subject, we may claim that "with solutions of sodium chloride of different degrees of concentration, we can provoke a powerful phagocytic, lymphagogue, eutrophic, and exosmotic action, while with the mercurial solutions we can set up antiseptic resolutive and antisyphilitic effects of a pronounced kind."

Some have claimed that the various serums may be profitably employed subconjunctivally, and that they have the advantages possessed by all local intervention. Hyperemia of the ciliary body is thus induced, and Wessely holds that a more copious afflux of antibodies into the aqueous humor results. Römer's method is to obtain the serum from a blister artificially produced, and he reports 40 cases of hypopyon-keratitis in which most excellent results are claimed. It is significant, however, that *evacuation of the hypopyon*

surgically was done in each case, which, to our way of thinking, would have probably effected a cure without the use of the serum. We shall have more to say about this method of autoserotherapy later on.

Drugs and other substances for internal administration.

For a long time it has seemed to me that the supreme therapeutic test of an ophthalmologist is his facility and resourcefulness in the internal administration of drugs or other substances for the cure of ocular diseases. If we go back to the Fathers of Ophthalmology we shall be at once impressed with their familiarity with general medical problems and principles. Many of them served a long apprenticeship in general medical service before restricting themselves to the consideration of ophthalmic problems only. And that it was to the unending and incalculable profit of their patients and of medical and ophthalmic science, no one can gainsay. I do not wish to labour the point, but I cannot here refrain from setting down my conviction that the ophthalmologist who is not first and foremost a medical man is a precious poor ophthalmologist. Our profession to-day offers numerous instances of brilliant but fearfully one-sided men whose viewpoint is shockingly distorted because of a lack of that broad medical foundation that is the starting point of all medical science. Witness, for instance, the indiscriminate use of mercury and the iodides. On such flimsy foundations are therapeutic diagnoses frequently made. Sometimes a parenchymatous keratitis is cured by mercurial treatment, and later the tuberculous origin of the disease becomes manifest. We should no longer be contented with symptomatic treatment, but delve into every corner in the search for the true ætiology. Let us grant, however, that we cannot always have an exact ætiologic basis for our general therapeusis and pass on to the consideration of the general means and measures at our command.

The doctrine of ascending doses of drugs is as old perhaps as the healing art. Is it as often taken advantage of as it should be? I doubt it. In the matter of the iodides, of Fowler's solution, and of dionin, it is, of course, in general use. But is it true of nux vomica and strychnia? In certain forms of muscular insufficiency, notably that of convergence, as suggested by de Schweinitz, this method has often rendered me yeoman service. And in the phlyctenular disorders of children, syrup of iodide of iron in ascending doses seems to me the most valuable single agent we possess. One of my little six year old patients is now taking 50 drops of the syrup three times a day and is flourishing to a degree. In the interstitial keratitis of childhood, it is also almost a panacea, and one of my ten year old patients recently took up to 90 drops of the syrup three times daily with almost magical results. Thyroid substance, thymus substances,

and pituitary substance are all of them vastly more effective if so employed. The same holds true of local remedies. Atropine gradually loses its hold in long-standing iritis, and nothing is of commoner observance than the diminishing effect of the same strength of solutions of the miotics in chronic simple glaucoma. One old lady with this malady is now using a 5 gr. to the ounce solution of eserin salicylate in her eyes three times a day. She began with a 1/4 gr. to the ounce solution of the drug and has been 10 years advancing to the present dose, but her vision remains 6/12 in one eye and 6/6 in the other, and her visual fields are fully preserved. There are many who would argue that if the dear old lady had been operated on ten years ago there would have been no need of all this ten years of constant attention, but in this particular connection I cannot repress the temptation to quote from the small boy's essay on pins, wherein he said, " Pins have saved many people's lives by not swallowing them ! " The moral is obvious.

In short, this axiom of the need of ascending doses of drugs is so palpable that it seems almost gratuitous to bring it to notice before this distinguished body, and I should have omitted it were I not persuaded that it is honored more frequently in the breach than in the observance.

Next we come to the consideration of a potent drug that has been more enthusiastically acclaimed and more bitterly assailed than almost any other in our whole armamentarium. I refer to pilocarpin. That it is not without its dangers no conscientious therapist will deny. In organic disease of the heart it is generally contra-indicated, and there are a few other conditions in which it is not well borne. But given the proper indications it is the eliminant *par excellence*. It has been urged that mechanical diaphoresis by arousing the superficial lymphatics accomplishes all that pilocarpin can be hoped to do without the inconveniences and latent dangers of the latter. To refute this postulate I am fond of referring to the hydra, a small aquatic animal sometimes found in aquariums. Its structure is extremely simple in that it consists of a series of rings of tissue so united that the animal is in reality a hollow tube. The most interesting fact about this tiny creature is that it may be readily turned inside out without in the least disturbing its functions. Immediately what was its mucosa becomes its skin and what was its skin becomes its mucosa. Without any evidence of inconvenience, it pursues the even tenor of its way. And if one choose one can again turn the creature inside out, when once more the animal promptly adapts itself to the reversed anatomy. Once more its skin becomes its gastro-intestinal tract and its gastro-intestinal tract its skin, and the little mariner goes on its way happy and contented. Such adaptation to environment is, of course, beyond human accomplishment, and it may be a far cry, but I am going to assume

for the sake of illustration that we are but glorified and complex hydras. The inter-relation of our skins and our gastro-intestinal tracts hardly needs mention here were it not that pilocarpin not only arouses the cutaneous expanse, but also the whole mucosa from the mouth to the anus. Not only that, but some of the viscera respond to its stimulus, and recently laboratory investigation has credited to pilocarpin qualities far beyond the most extravagant claims that have ever been made for it by clinicians. I quote from that recent remarkable book by Kolmer, entitled: "Infection, Immunity and Specific Therapy,"* Kolmer states (page 157) as follows: "In reality, by the act of immunity, certain cells of the body become converted into *cells that secrete specific antitoxin*, and, as shown by Salmonson and Madsen, *the administration of pilocarpin* (which augments the secretion of most glands), *also produces in immunized animals a rapid increase in the anti-toxin contents of their serum.*" This should give us pause, for here is laid down, in terms of the biologic laboratory, the precise method of action of this drug, which fortifies most of the cellular tissue of the body. This also explains its unusual power over many phases of disordered metabolism that often manifest themselves in ocular disease.

The brief recital of a few cases treated with pilocarpin may prove of interest:

C. A. R., female, *æt.* 35, presents with an old central plastic choroiditis in the left eye, and beginning central choroiditis in the right eye, sharply confined to the macular region, and bordered all round with a fine vascular fringe. Vision with R.E. equalled 2/60. There were no clinical evidences of syphilis, and the Wassermann was negative. Heart and lungs were normal. Clinical history and findings were negative throughout. She was placed at once upon daily sweats with pilocarpin hypodermically, beginning at 1/20 of a grain, and in two weeks increasing to 1/4 of a grain. Salicylates were used freely without the slightest gastric irritability. Strychnia in ascending doses was given hypodermically daily up to 1/8 of a grain. In three weeks the choroidal lesion in the right eye was absolutely quiet, and the vision had risen to 6/15. To-day, after eight years, it is 6/12, the choroidal lesion being still quiet, characteristic of the picture known as "hole in the macula."

M. I., female, age 25, with a lesion in both maculæ corresponding to the right one in the preceding case. Wassermann positive. Heart, lungs, and kidneys normal. Placed on pilocarpin treatment, combined with vigorous mercurial treatment. Vision in both eyes when treatment was instituted 6/60. One of the noteworthy features in connection with pilocarpin diaphoresis is the gigantic doses of any and all drugs that are tolerated without the slightest signs of toxæmia.

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* W. B. Saunders & Co., 1914.

The biniodid of mercury in this case was carried up to 1/2 grain three times a day. In three weeks, the vision in each eye equalled 6/9, and after seven years, remains at that point. This case to-day also presents in each eye the typical picture of "hole at the macula."

F. E., male, *æt.* 40, single, the subject of cerebrospinal syphilis with bilateral complete iridoplegia and bilateral abducens palsy. Had been treated for a year with mixed treatment. Placed on pilocarpin diaphoresis daily, with biniodide pushed rapidly up to 1/2 grain three times a day. In six weeks complete restoration and function of both external recti, with binocular vision.

K. J., male, *æt.* 35, bilateral abducens palsy of two months' duration. Wassermann positive. Had been taking mercury and iodides steadily for two months with much intolerance. Heart, lungs, and kidneys normal. Pilocarpin diaphoresis, forced mercury and iodides, and ascending doses of strychnia hypodermically. In three weeks complete functioning of both external recti.

In these last two cases the chief value of the pilocarpin diaphoresis was as an adjuvant to the other medication.

N. *Z.*, male, *æt.* 45, with typical retinitis pigmentosa. Had been told three weeks previously that his case was hopeless, and that he would eventually go blind surely. Had always been a very small drinker, but the dismal prognosis held out had so depressed him that he went on a week's debauch, at the end of which time he presented in my service at the Samaritan Hospital with vision of 3/60 in each eye. He had the card of another hospital on which the recorded vision, before he went on his debauch, was 6/60 in each eye. His heart and kidneys were none too good, in spite of which, however, he was placed on pilocarpin diaphoresis and ascending doses of strychnia. At the end of four weeks his corrected vision was 6/12, and this was held for five years, during all of which time he has been steadily at work, and supporting his family of five. I am far from holding that so dismal a condition as retinitis pigmentosa (which I take to be congenital) is curable. I simply quote this one case as illustrating the results of thoroughgoing therapeusis as against engendering in the mind of the patient the idea that he is doomed.

Mrs. C., *æt.* 30, presents with a history of increasing exophthalmus for two weeks, with gradual impairment of motility and loss of sight. At the time she was first seen, the right eye was proptosed 13 mm., displaced outward and downward, absolutely immobile, with vision equal to light perception only. There was high grade chemosis of the bulbar and palpebral conjunctiva. There had been frightful pain in the right fifth nerve distribution, which had given way to anæsthesia. The right pupil showed no direct nor consensual reaction ; optic nerve normal. Retinal veins very full and tortuous.

Optic nerve slightly œdematous. Mental depression was profound. The other eye was normal. There was a history of a nodule removed from the left breast four years previously, which had been pronounced by one of our good pathologists as malignant. This furnished a prognosis gloomy enough to suit the deepest-dyed pessimist. The Wassermann was negative, but this time we went over the head of the serologist and ordered mercurial inunctions and pilocarpin sweats. Within a week there was some slight improvement. In two weeks the motility of the eye began to return and sodium cacodylate intramuscularly was begun. In another fortnight motility in the eye was full and complete and the globe had receded to its normal position in the orbit. Unfortunately, the optic nerve had been too long pressed upon and it developed complete atrophy. But the woman meanwhile had put on 25 pounds, and to-day, after one year, is an active sound woman. The case has been detailed not to point out any special efficacy of pilocarpin, but simply to drive home the lesson that when we are licensed to practise and therapeutic weapons are placed in our hands, we solemnly engage to wage war upon disease and impending death to the uttermost, no matter how dark the outlook.

The use of pilocarpin by the mouth for its general lymphagogue properties has been urged by de Schweinitz for many years. He is in the habit of using 1/40 to 1/20 of a grain three times a day. In a patient over 45 with presenile arteriosclerosis and low-grade changes in the choroid and vitreous, there is no more potent agent than pilocarpin by the mouth. It reduces the vascular pressure, establishes better metabolism, equalises the circulation, and enhances the condition of such patients in every way. Idiosyncrasies must be watched for, as some patients will not tolerate more than 1/50 or even 1/100 of a grain three times a day.

With all the arguments against pilocarpin properly presented, I am still persuaded that by the hypodermic use of this drug, useful vision has been preserved to many patients, a result that would not have ensued with conventional methods. That the drug and its method of use deserve study and close observation goes without argument, but that it is one of the most potent weapons, particularly in the most obscure forms of intra- and extra-ocular disease is one of the convictions that have crystallized out of 25 years of experience in ocular therapeutics.

Salvarsan and neosalvarsan have become integral members of this family. In the presence of the positive Wassermann reaction they are strongly indicated, especially in disorders affecting the uveal tract. This is their field of brilliant efficiency. In syphilitic disorders of the optic nerve we must sometimes consider carefully before advising the organic arsenic compounds. In acute forms of the disorder we are disposed to recommend these agents if the

laboratory indications are positive. But in the subacute and chronic forms we should vote for mercury by the mouth. In interstitial keratitis, the results of arsenobenzol medication have not fulfilled our expectations. On the contrary, our faith is pinned to mercury in the management of spirochetic parenchymatous keratitis. Nothing is more interesting than the return of our prominent syphilologists to mercury as the control of syphilis. Seven years ago we ventured the prophecy before the State Medical Society of Pennsylvania that the profession would eventually return to our good old friend Mercury as an antidote to Venus and her maladies, and we are to-day witnessing that very trend among our most advanced thinkers in syphilology.

The position of the salicylates is assured and requires no discussion.

Pre- and Post-operative Treatment of Surgical Cases.

This is a phase of ocular therapeutics that, in our judgment, is often slighted or, indeed, entirely neglected. If a glaucoma iridectomy for anything but the fulminant form of acute glaucoma is in prospect, a thoroughgoing course of the best possible elimination is strongly indicated. This is to be determined according to the caprice of the operator. "*Chacun à son goût.*" Our own practice is to employ the formula of the late Dr. Goodell, namely, iron, quinine, and strychnia and mercury, with enough of the mercury to counteract the constipating effect of the iron in the Blaud's mass. Salines are used if needed, the preference being given to Sal Rochelle. A few pilocarpin sweats will be helpful in nearly every case. Miotics should be pushed vigorously up to the time of operation. The same procedure, with the exception of the miotics, is in order if extraction of cataract is contemplated. Argyrol is instilled into the eye after operation, as has been already outlined. The fourth day after the operation the iron, quinine, and strychnia and mercury combination is again instituted, with Sal Rochelle, as indicated. After cataract extraction, dionin is begun on the eighth day, to promote absorption of post-operative *débris*. This treatment is continuous until the fourteenth day after the operation. In patients over 50 years of age, there are few indeed who come to intra-ocular operations that are not the subjects of metabolic vices in the blood that may either lead or predispose to all manner of post-operative complications. As to complicated cataracts, that surgeon is bold indeed who will approach such operations without the most careful preparation of the patient for a fortnight in advance, and the same principles apply to the post-operative treatment of the case. Every surgeon of experience knows how small a percentage of cataract cases escape without a low post-operative iritis. Call it "quiet iritis," or what you will, we cannot blink the fact that it is

almost bound to occur and may require but a small change in the quality of the blood stream to determine a nasty active iritis. To prevent such a disappointment after a skilfully performed operation, to turn an impending defeat into a victory, is one's simple duty, not only for the patient's sake but for the surgeon's also.

Hormone- or Organo-Therapy.

The introduction into therapeutics of preparations containing the active principles of the internal secretions is one of the achievements of modern medicine. In the blood there are countless substances of the nature of hormones, related to one another, and performing innumerable functions. Naturally, there is still a tendency to look askance upon the use of animal extracts in therapeutics. The attitude of the profession is well set forth in the following sentence from the preface of the work on the "Internal Secretions" by my colleague, Dr. Sajous. "If any daring member has introduced a subject bearing on medical treatment, it has been with an apologetic air or humble mien, well knowing that if his remarks had reference to the utility of drugs in the treatment of disease, they would be subjected to good humoured banter and received by those sitting in the seats of the scornful with amused incredulity."

Let us admit at the outset that the only valid test at present in the case of organic extracts is clinical experience under conditions which can be repeated by others with comparatively similar results. With this frank admission that all hormone therapy is as yet empirical* in the best sense of that word, let us proceed to consider the preparations that may appeal to the ophthalmologist.

First and foremost, stand the preparations of the adrenal glands. Used locally in the eye, their action is now well understood. Their main application, in the very nature of things, is in ophthalmic surgery to obtain a bloodless field, for which purpose we are under a heavy debt to organotherapy, if for no other. But adrenalin and its congeners have other uses than these. In the treatment of exophthalmic goitre adrenalin substance is in high esteem by some of our best clinicians. Gibson at the 1912 meeting of the British Medical Association, urged that under its use the pulse rate was reduced, the protrusion of the eyeballs was markedly lessened, the thyroid diminished in size, and the tremor and other nervous symptoms vanished. We have seen the same gratifying results follow the use of thymus substance, and Harrower in his work ("Hormone Therapy") quotes a number of such observations.

*Since the presentation of this address, the application of the various Abderhalden tests for the specific ferments in the blood has been demonstrated, so that we may soon be upon more nearly scientific ground in determining what form our organotherapy shall take.

Adrenalin solutions also have a certain value, perhaps, by altering intra-ocular pressure in conical cornea, as we have proven to our own satisfaction. And in those follicular conjunctival conditions that closely stimulate trachoma the combination of adrenalin and holocain, as suggested by Shoemaker, of St. Louis, has rendered us good service.

Thyroid substance naturally occupies a prominent place in this list of drugs. As pointed out by Radcliffe, the thyroid insufficiencies seen in women between 45 and 55 respond beautifully to thyroid medication, and many obscure ocular symptoms encountered in such subjects yield in a way that compels our attention. Another field of usefulness is in those forms of parenchymatous keratitis seen in husky young women when antisyphilitic medication has been unavailing. Especially in the sclerosing varieties of keratitis has it furnished brilliant results. But it is powerfully destructive in its metabolic effects, and should not for this reason be used in tuberculous subjects. The tendency has been to run too large doses. 1/5 to 1/2 a grain of thyroid substance is quite sufficient as a beginning dose.

About a year ago I mentioned in the *New York Medical Journal* a case of hypophyseal disease in a man of 35 with complete bitemporal hemianopsia. The hypophysis had in all probability gone into a state of cystic degeneration, as indicated by the skiagraph. Combined use of thyroid and pituitary substance brought about complete restoration of form and colour fields. This lasted about five years. Finally, the patient grew tired of the medication and discontinued it. In about a year he again lost both temporal fields absolutely. Again, he was placed on this combined organo-therapy, and, again, he regained full form and colour fields Once more, he grew negligent about his medication, and about six months ago, his temporal fields began to shrink. He disregarded this warning, and only recently has he resumed the hormone therapy. At the present writing his hemianopsia is complete even for light, and combined thyroid and pituitary medication is being forced. What the result will be this time, only the future can tell, but the results in this one case strongly indicate what may possibly happen in the future if such cases are taken early, and patients are made to understand that the organo-therapy will have to be adhered to. The mortality in these cases after operation is still too great to justify operative interference until hormone therapy has been fully tried.

Within two months a combination of thymus and pituitary substances has been used in an eleven-year old boy with classic interstitial keratitis, as an adjunct to the mercurial treatment. The boy was a stunted physical specimen, and the way he has developed physically is something to behold. In this same connection I cannot forbear mentioning two children who were brought to me for

correction of errors of refraction. Both were perfectly formed children of high-grade mentality, but both were 2 to 3 years retarded in their physical development. In each case the thymus-pituitary combination was suggested to and adopted by the family medical adviser, and, as in the case just recited, the response in physical growth was simply astonishing. In one case the accession in general physical well-being was so marked that the glasses were thrown aside.

A few words as to those post-operative asthenopias seen in women after oöphorectomies may not be amiss. That they try our uttermost resource, and are oft-times a pest, is a matter of general agreement. In three such cases within the past year, all the amazing ocular symptoms were dispelled by the constant use of ovarian extract. In dismissing this phase of ocular therapeutics, we can only record our conviction that the results to be obtained in this field are as yet undreamed of.

Vaccine and Serum Therapy.

If the charge of empiricism may be laid against much of our therapeutics, then here is a field in which one may be either the rankest empiricist or may adjust his therapy with the utmost scientific nicety. That the use of the tuberculin preparations is empirical cannot be gainsaid. And yet such an avalanche of evidence has accumulated that one cannot claim to be versed in ocular therapeutics if he do not stand ready to apply this remedy in suitable cases. Observe that I specify suitable cases. There is no class of cases that needs closer study for a correct final diagnosis than this peculiar class, and I ally myself whole-heartedly with those who claim that the diagnosis of ocular tuberculosis should not be made until every other possible causative factor has been ruled out. Once this has been done, tuberculin treatment may be instituted with due caution as to a minimal beginning dose, and care that the drug be kept within the point of pronounced reaction. In phlyctenular children, in episcleritis, in choroiditis, and in certain phases of iritis, there is no longer any doubting the beneficial action of tuberculin. To-day this is one of the best accepted clinical facts. Perhaps in the next few years we shall come upon more certain methods of diagnosing ocular tuberculosis. Besredka has recently succeeded in securing complement fixation reactions from the blood of tuberculous patients, and this may prove to be the way out of our difficulty, for in the past two years we have ourselves seen brilliant results follow vaccine therapy based on complement fixation reactions. In the *Ophthalmic Record* for January, 1915, Granville Lawrence and I have recorded three cases of gonorrhœal iritis in which the ætiologic diagnosis was made possible only by the complement fixation test for gonococcus. In each one of these cases there was absolutely no dis-

coverable clinical evidence of gonorrhœa. In one case the gonorrhœal infection had occurred 15 years previously, in one case 5 years prior, to the iritis; and in one (a grandmother) we could get no history of a gonorrhœal infection. All three were promptly treated with gonococcus vaccine, *and that only*, immediately on receipt of the serologist's report; and the relief of pain and clearing up of the iritis was little short of magic. In the November, 1915, number of the *Ophthalmic Record* I have put on record a case of influenzal iritis occurring in a 32 year old married man. The complement fixation test for spirocheta, gonococcus, pneumococcus, streptococcus, and staphylococcus was negative. There was a faint positive reaction for influenza, and on this finding, influenza vaccine was made the sole general treatment. The relief of pain was practically immediate (3 hours), and the inflammatory condition subsided in six days. Three weeks later there was a violent recurrence of a spongy iritis with an exudative membrane covering the whole iris and anterior capsule, and extending into the angle of the anterior chamber. Another injection of influenza bacterin was made, with prompt relief from pain, and complete disappearance of the membranous exudate in five days. The relief from the frightful fifth nerve pain that all such patients are subject to, is comparable only to the action of morphia. Within the past fortnight we have studied a plastic iritis in a 51 year old man, all of whose complement fixation tests were negative. His teeth were in a fearful condition, and complete extraction of all of them was advised by a dental surgeon after skiagraphic studies of the alveolar processes. The man was also given a mixed staphylococcus vaccine after bacteriologic study of his oral mucosa. When first seen, the pupil was 2·5 mm., irregular, and bound-down all round. In ten days the eye was absolutely quiet, the media were all clear, and the corrected vision was 6/6, as against 3/60 when he was first seen. This was a pyorrhœal iritis, and the therapy was based on accurate diagnosis.

And now a few words as to vaccine therapy when no accurate indication is given by the complement fixation tests; that is to say, when it is based on clinical findings alone. Assume that one has to do with an iritis in a patient who has also been the subject of a polyarthritis. Even with all complement fixation tests negative, I do not think we need hesitate to use a streptococcic mixed vaccine in such a case. The amount of protein poison in such an injection does not seem to be able to do any harm, and the chances for resulting good are so large that we are justified in giving the patient the benefit of the doubt. Let us admit that vaccines are protein poisons of low degree potency. Let us admit, further, that the treatment is based on clinical findings only. Do not the gentlemen who treat pneumonia and gastric ulcer and appendicitis on a clinical basis, pure and simple, fill their patients with drugs that are low-grade

poisons, just as hopefully as if they administered a vaccine on the same grounds? Hundreds of thousands of vaccine injections have been administered in this country in the last five years, and few indeed are the reports that have come to hand of any deleterious effects.

In chronic dacryocystitis a mixed vaccine of streptococcus and staphylococcus has rendered us valuable service as an adjunct to the local treatment, and in a threatened post-operative infection after cataract extraction, an eye that gave every promise of going to the bad was saved by sero-bacterins.

I am far indeed from advocating the indiscriminate use of vaccines. It is the greatest danger with which our profession is just now threatened. We cannot, therefore, insist too much on the search for the most accurate findings possible on which to formulate working conditions. Nevertheless, I hold that when the laboratory leaves us in doubt, we are justified in searching for clinical facts to justify the employment of these newer weapons that promise so much to gravely threatened eyes.

What has been said may reveal what many will consider a bias in favour of vaccine therapy. When the laboratory findings are definite, we unhesitatingly endorse vaccine treatment, and so far as properly selected clinical cases are concerned, we are again perfectly willing to admit the soft impeachment. Let us, in the words of St. Paul, "Prove all things; and hold fast to that which is good."

If certain phases of ocular therapeutics have been herein omitted, it was because of my feeling that personal experience would find more favour than a mere review of the present status of ocular therapeutics in general.

In conclusion, let us not be either over enthusiastic about the qualities of the new, nor iconoclastic regarding the therapeutic ideals of olden days. Let us rather cultivate the diagnostic sixth sense, the faculty of hewing close to the line, and add to these, if we may, the rare gift of separating the few grains of fact from the dust of uncertainty that has enveloped therapeutics in general for the past quarter of a century.

THREE CASES OF FUR INFECTION OF THE CONJUNCTIVA FROM CATS.*

BY

ARNOLD LAWSON.
LONDON.

ALL three cases occurred in children whose parents were of the prosperous classes, and whose homes were therefore of the cleanest and best. I have never personally come across a similar case in an adult.

(1) My notes of this case, which occurred some years ago, are not satisfactory, as I have somehow lost that part of them which referred to the pathological examinations. The patient was a girl of 15 years, an only child, who somewhat lacking playmates, was devoted to a Persian cat. One evening shortly after having had an extra romp with the cat, during which she had frequently buried her face in the cat's fur, in the way children are so fond of doing, her eyes became suffused and she also developed a bad sneezing fit. The next day her eyes and nose were swollen and discharge began to appear, and by the evening, when I first saw the child, the affection was acute. Both eyes were streaming with yellow purulent discharge and the lids were much chemosed. The nostrils were similarly greatly swollen, and purulent slightly sanguineous matter was freely oozing from them.

Cultures were taken of the discharge and also from the cat's fur. My recollection of the result, which, as stated, I have unfortunately lost from my case book, is that the staphylococcus pyogenes aureus was in abundance in the eye discharge, and that the same organism was isolated from the fur.

Energetic treatment on conventional lines soon effected improvement and the child eventually made an excellent recovery without any damage to the eyes.

It was for two or three days a source of great anxiety, as it was one of the most acute cases of purulent conjunctivitis that I have ever seen.

One has, of course, to be careful in such cases before definitely assigning the cause, but here there seemed no other possible explanation, as the child was living in the best of circumstances and was perfectly well until the cat episode occurred. I need scarcely add that the cat met with an untimely end.

(2) This case also occurred in a child of well-to-do people. The patient was a boy of 14 years of age and the case was an extremely complicated and severe one. The history was as follows.—About

*Read in the Section of Ophthalmology of the Royal Society of Medicine on February 7th, 1917.

a fortnight before I first saw the boy, a slight inflammation was noticed in the left eye, accompanied by slight discharge and a slight swelling over the left parotid. The local doctor thought that it was a case of mumps, and the boy was isolated. The swelling, however, did not run the course of mumps, and as it gradually grew larger and the conjunctivitis increased in spite of zinc lotion, the boy was sent up to me. There was during this fortnight no fever and no pain.

When I saw him, I noticed that the whole left side of the face was much swollen and that over the parotid there was a brawny induration not particularly tender, but with the skin slightly reddened over the angle of the jaw, extending into the neck, and almost continuous with the parotid swelling was another indurated mass evidently consisting of swollen glands. The lids of the left eye were considerably swollen, and eversion for examination was difficult. When this was effected, the conjunctival surfaces of both tarsi were seen to be fairly covered by coarse granulations, especially marked in the upper lid, where near the fornix were some bunches of exuberant granulation tissue. The retro-tarsal portions of both sacs were much chemosed with great enlargement of the follicles, and a fairly abundant muco-purulent discharge lay in the furrows of the swollen tissues. The bulbar conjunctiva was also considerably swollen and rather pink in colour. The cornea and all other structures were quite healthy.

The cause and nature of the trouble seemed at first obscure. Not unnaturally tubercle crossed my mind, but I dismissed it as improbable on account of the rapidity with which the disease had developed. There was further a history of a Persian cat of which the boy was very fond, and he was in the habit of walking about with it perched on his left shoulder; he cuddled it at irregular intervals. Systematic investigation was the only possible way at arriving at the causation and in the meantime the boy was put under an anæsthetic and the disease treated by thorough cutting and scraping, finishing up by thoroughly swabbing out the upper and lower sacs with a 2 per cent. solution of silver nitrate. The boy did very well and the glandular swellings at once began to subside. However, steady treatment for about six weeks with argyrol, weak copper drops, and an occasional touch of mitigated silver stick to spots where the granulations threatened to recur, was necessary before the boy was really well and the glands were not completely normal again for a little while longer still.

Now as to the investigation. The scrapings were put into sterile tubes and submitted immediately after operation to expert examination, and from them were isolated (*a*) streptococcus longus, (*b*) streptococcus brevis, and (*c*) staphylococcus albus. Obviously the streptococcus was the important organism, and examination was directed to seeing if this could be found in the cat. The question

arose as to whether any other animal but the cat was likely to be a factor, and as there was also a pet dog in the house (of which, however, the boy was not particularly fond), it was decided to examine both.

Portions of the hair and swabbings of the skin were taken in each case. The dog's hair revealed (*a*) staphylococcus albus, (*b*) bacillus subtilis, and (*c*) proteus vulgaris, whilst from the skin swabbing were obtained (1) staphylococcus aureus and albus, and (2) micrococcus catarrhalis. In the cat, the chief organism found in the hair was a staphylococcus albus, whilst in the skin swabbing a number of organisms were found, the most important being (*a*) streptococcus brevis and (*b*) staphylococcus citreus, the other organisms consisting largely of bacillus proteus vulgaris and the bacillus subtilis.

It was, therefore, only in the case of the cat that an organism, a streptococcus similar to that found in the lid scrapings, was discovered. This fact, coupled with the history of the boy's fondness for the cat, gave the verdict unhesitatingly to the cat as the causative agent. The dog being found "not guilty" was acquitted, whilst the cat was summarily executed.

(3) This case was undoubtedly the worst of the three, for if the trouble had not been eradicated, it might undoubtedly have led to the child's death. It occurred in a little girl, aged five years. When staying with some friends of her parents in the country, where there was an adjacent farm, she contracted a muco-purulent conjunctivitis of a mild type. The history of its onset was that it supervened very shortly after nursing a cat which was a great favourite with her, and which divided its favours impartially between the child and the denizens of the neighbouring cowsheds. The conjunctivitis proved intractable to ordinary treatment, and she was taken to an expert for advice. Still, treatment did not improve matters, and after a time the submaxillary and sternomastoid glands on the same side began to enlarge. And so the case drifted on for two or three months, the eye apparently remaining in much the same condition of chronic mild conjunctivitis, and the neck trouble ever growing more formidable. Ultimately, I was called in to see the child, and on everting the upper lid, I found a mass of exuberant cock's-comb granulations occupying the greater part of the retro-tarsal tissue and trespassing on the posterior edge of the tarsal plate. The lower sac was perfectly healthy except for a little reddening, and the trouble must have been discovered if anybody had everted the upper lid.

The clinical appearance combined with the history and enlargement of the cervical glands made one suspect that it was a case of conjunctival tubercle.

I at once took the child into a nursing home, and under an

anæsthetic, cut and scraped away all the infected parts; finally, with due precautions, coated the whole operated surface with mitigated nitrate of silver stick. A certain amount of reaction followed as a matter of course, but warm boric bathings and pads, with the free use of weak iodoform ointment, answered very admirably, and the child made an excellent and complete recovery. I warned the parents that, if the glands in the neck were tuberculous and resultant on the conjunctival growth, the scraping and cutting away of the latter would probably be followed by an outburst of inflammation in the glands, and this is precisely what happened. Three little operations in the course of the next few months had to be performed on glands which in one case at any rate broke down, but ultimately the neck cleared up thoroughly well, and now, four years since the lid operation, the child is quite well without the slightest sign of recurrence either in the eye or glands.

The scrapings were submitted to Mr. S. H. Browning for examination. He reported that direct smears made from the ground-up scrapings showed the presence of a very few bacilli, which were very short and fat and resembled the bovine type of tubercle bacilli. Some of the scrapings were injected into the subcutaneous tissue of a guinea-pig, which rapidly wasted and died in a fortnight. The guinea-pig after death showed a small area of necrosis round the inoculation site with slight enlargement of the corresponding inguinal glands, but no other lesion. Microscopical examination from the local lesion and from the glands showed abundant tubercle bacilli. Mr. Browning adds that "these tubercle bacilli were, in his opinion, of the bovine type, and the rapid death of the guinea-pig from the inoculation of extremely few bacilli (only five were found in twelve slides of the scrapings after prolonged search) tends to prove their bovine origin."

The guilt of the cat could unfortunately only be fixed by circumstantial evidence, because in spite of my best endeavours, I could never succeed in getting hold of it. The owners, indignant at the imputation cast upon their pet, and solicitous for its welfare, stoutly, and perhaps advisedly, refused to allow even an examination of its fur and skin. Still, I think the very great probability that the child was infected with the bovine type of tuberculosis, and the fact that the cat was a farm-yard cat and was a pet of the child who was continuously hugging and cuddling it, renders the ætiology of the case pretty clear and makes it fair to assume that the cat was the means by which the child was infected.

I have drawn the attention of the Section to these cases, not because there is anything specially new or interesting in them, for a fair number of similar fur infections of the eye already have been reported, but chiefly because I do not think the matter has been properly brought before the public, which does not sufficiently realize

the danger of cats as a means of disseminating disease. The germ-carrying guilt of rats, mice, flies and other noxious creatures, which are in themselves a nuisance and are generally hated, has been cordially recognised and means to deal with them by extermination are eagerly welcomed, but although I believe the cat is as bad an enemy in this way as any animal or insect, I fear that any attempt to exterminate these wandering nocturnal curses would meet with a hopeless opposition. I think the public, as a body, still believes in the fallacy of the cat being more cleanly than most other species of animals, and yet quotes the argument of the free use of its tongue and saliva on its fur to clinch the subject; and so, I fancy, the only thing to do is to impress more forcibly the fact that the cat, as a pet, is a source of danger chiefly to children who naturally love to cuddle it and to bury their head and faces in its septic fur.

ABSTRACTS.

I.—OPERATIONS.

(First Notice.)

1.—Cataract.

(1) **Starkey, Horace M. (Rockford).—Report of case of expulsive retrochoroidal hæmorrhage following cataract extraction.** *Ophthalmology*, April, 1915.

(2) **Burnham, G. H. (Toronto).—Some unusual features in the case of a senile cataract extraction.** *Ophthalmic Record*, October, 1915.

(3) **Heyl (Munich).—Statistics about cataract operations with special consideration of the relationship between ripeness of the cataract and secondary cataract. (Statistik über Staroperationen mit besonderer Berucksichtigung der Beziehungen zwischen Reife des Stars und Häufigkeit des Nachstars.)** *Archiv für Augenheilkunde*, Bd. LXXVIII, 1915, S. 239.

(4) **Bruns, Henry Dickson (New Orleans).—The ambulant after-treatment of cataract extraction; with a note on post-operative delirium and on striped keratitis.** *Trans. Amer. Ophth. Society*, Vol. XIV, Part ii, p. 473, 1916.

(5) **Wheeler, John M. (New York City).—A study of hæmorrhage into the anterior chamber, subsequent to operations for hard cataract.** *Trans. Amer. Ophth. Society*, Vol. XIV, Part ii, p. 742, 1916.

(6) **Blanco, T. (Madrid).—Iridectomy in extraction of senile cataract. (Iridectomia en la extraccion de la catarata senil.)** *Archivos de Oftalmologia Hispano-Americanos*, October, 1916.

(7) **Gros and Fromaget.—Two cases of sub-choroidal expulsive hæmorrhage during cataract extraction; trial of a prophylactic treatment. (Deux cas d'hémorragies sous-choroidiennes expulsives au cours de l'opération de la cataracte; essai de traitement prophylactique.)** *Ann. d'Oculistique*, Vol. CLIII, November, 1916.

(1) The case reported by **Starkey** presented no feature of special moment. As in others of the kind, there was nothing in the state of the blood pressure, blood-vessels, etc., to give reason to expect the accident or to explain its occurrence. A preliminary iridectomy did well, and the extraction went smoothly. The expulsive hæmorrhage occurred soon after removal of the speculum.

A. J. BALLANTYNE.

(2) **Burnham** found that in extracting a hard senile cataract, after preliminary iridectomy nine months previously, the lens became dislocated downwards on lightly touching it with the intention of tearing the capsule. When the lens was extracted in its capsule by means of a wire scoop, it was noticed that the whole of the suspensory ligament was attached to it, like a circular apron. The outer pillar of the coloboma was prolapsed, and eventually torn through. Notwithstanding these complications, and considerable escape of vitreous before and after the delivery of the lens, the wound healed well, and good vision (6/12) was obtained.

J. JAMESON EVANS.

(3) The indication for extraction of cataract has changed, writes **Heyl**, on account of antiseptic and aseptic methods, and of the better methods of handling secondary cataract or opaque capsule.

Hess in his *Pathology and Therapy of the Lens System*, wrote :—"It does not seem to me proved that following operations for unripe cataracts the percentage of secondary cataracts is any larger than following the complete operation of extraction of ripe cataracts." He has come to this conclusion after operating upon unripe cataracts for some years.

While Kuhnt in 83 per cent. of his cataract operations performed secondary operation, in the statistics of Knapp, Pinto, and Völkers, the number of capsule operations ran from 61 per cent. to 66 per cent.; in others, again, from 9 per cent. to 10 per cent. The figures of Wittmer and Nagano in 1910, from 600 cases at Hess's Clinic, gave a percentage of 70 per cent. Kuhnt operated for secondary cataract : first, in all cases where the vision was less than 1/3 normal; secondly, in all cases where the pupillary area (even with good vision) was not clear; and, thirdly, where it was plainly seen that a secondary cataract would later develop.

Hess operates for secondary cataract if the vision is 0·3 or less.

The 200 cases from which Heyl draws his statistics were as follows:—

	Cases.
Senile cataract with complete lens opacity	96
Senile cataract with partial lens opacity	60
Senile cataract with heterochromia, with complete lens opacity	4
Senile cataract with heterochromia, with partial lens opacity	1
Nuclear cataract	25
Zonular cataract	4
Black cataract	2
Complicated	8

In this series secondary cataract was operated for 24 times. In 100 cases with complete peripheral opacity the operation was performed 10 times. In 92 cases with incomplete peripheral opacity, 8 times. In 8 cases of complicated cataract, 3 times.

The vision obtained in the series is given in percentages. Also, where poor results were obtained, the problematical causes are given in tabulated form, as where the vision was 0.1 or less, the following were the causes: choroidal atrophy with vitreous opacities; opacities of the vitreous; corneal opacity with iris irritation; central scotoma; macula of the cornea; and high-grade myopia.

S. HANFORD MCKEE.

(4) **Bruns** advocates the "ambulant" treatment of patients after extraction of cataract. No case in which vitreous was lost was treated in this way. There were 10 per cent. of failures among 371 patients confined to bed and to the hospital, against 7 per cent. among 232 extractions allowed to get down from the operating table, and to make their way home on foot or in the street cars. There were two accidents among patients treated in the last-named way, and both were due to the fact that the patient was allowed to visit the hospital unattended. They sustained severe falls, and their eyes were lost, in one case by iridocyclitis and in the other by intra-ocular hæmorrhage.

As regards post-operative delirium, during the period when Bruns treated his cataract patients by the internment plan, he had several cases. The delusion took the form of terror, or the apprehension of some great danger, and in two instances the patients succeeded in eluding the attendants, and in killing themselves, by leaping over the banisters, or by jumping out of the window of the third story. Not a single instance of dementia occurred among the 232 "ambulant" cases.

Striped keratitis has virtually disappeared from Bruns's work since he adopted, some years ago, the dressing described by Blanco, of Madrid. It consists of a couple of layers of gauze, the first fastened by collodion to the rim of the orbit just above the eyebrow, to the

temple, and to the inner side of the nose. This is covered by a small pad of absorbent cotton wool, which, in turn, is covered by a second layer of gauze, a little larger than the first, also cemented down by means of collodion. Over all Bruns places a cataract cage and a "half-figure-of-8 mosquito-net bandage." He ascribes the almost total absence of striped keratitis to the fact that the Blanco dressing produces no pressure upon the eye. He does not claim, however, that post-operative pressure is the sole cause of striped keratitis. S. S.

(5) This thesis by **Wheeler,** presented for membership of the American Ophthalmological Society, is now published in the Society's *Transactions.*

It consists in a careful review of the literature dealing with bleeding into the anterior chamber subsequent to operations for senile cataract, and, in addition, an analysis of the complication as observed in 2,123 such operations performed by many different surgeons during a period of ten years (1899-1909) at the New York Eye and Ear Infirmary.

The operations at the Infirmary included preliminary iridectomy, extraction with iridectomy, simple extraction, and intra-capsular extraction. Among these, bleeding into the anterior chamber occurred in 97 eyes; that is, in 4.57 per cent. of all cases. The estimate is probably on the low side, since some of the cases may have escaped the observation of the house-officers. Hæmorrhage took place from one to twenty-eight days after operation. Of the preliminary iridectomies, 2.17 per cent. suffered from hæmorrhage; of the extraction with iridectomy, 6.94 per cent.; of the extractions after iridectomy, 3.12 per cent.; of the simple extractions, 3.97 per cent.; and, finally, of the intra-capsular extractions, no fewer than 16·66 per cent. were complicated in that way. But, as the author remarks, the number of intra-capsular extractions was so small as to make the comparison unfair. Of the total 97 patients, 76 had one hæmorrhage; 15 had two hæmorrhages; 3 had three hæmorrhages; 1 had four hæmorrhages; and 2 had repeated hæmorrhages. When considering the question of age, a somewhat remarkable circumstance comes out, namely, that the highest percentage (7.57) was observed in patients between 40 and 50 years of age, and not in older subjects, when it might naturally be inferred that the blood-vessels would be more brittle. Wheeler suggests that this seeming anomaly may possibly be accounted for by the greater activity and liability to injury on the part of middle-aged patients, which more than counterbalances the possibilities of injury due to dementia and irresponsibility on the part of older subjects.

Of the total number (2,123) of cases, 38 had sugar in the urine, and it is significant that of these, 28.94 per cent. suffered from bleeding into the anterior chamber. The amount of sugar, however,

appeared to have little influence as to the likelihood of the event taking place. Albuminuria, too, predisposes to bleeding, but less markedly than glycosuria. For example, in 31 patients who presented albumin, there were 4 (12.9 per cent.) who developed hyphæma. In other words, albuminuric patients are less prone to bleeding than are diabetic subjects, but are more liable to hæmorrhage than those who have neither albumin nor sugar in the urine.

As to the results of the hæmorrhage, Wheeler, in the absence of exact figures, expresses the opinion that it has very little influence upon the final vision of the patient.

Wheeler makes no categorical statement with regard to the cause of the hæmorrhage, but it may be noted that H. Knapp, as quoted in the abstract of literature given by the author, expressed the definite view that in a large number of the cases after-hæmorrhage may be traced to injury, an opinion endorsed by Haskett Derby and Köllner. S. S.

(6) **Blanco** thinks that iridectomy is a mutilation which should be avoided, whenever possible, in the extraction of senile cataract. He lays more stress than appears to the reviewer to be justified on the optical disadvantages of iridectomy and its bearing on the final result. He has not found it efficient in doing away with prolapses, although he admits that they are smaller after iridectomy. He lays stress also on the frequency with which prolapse of capsule follows the combined operation.

In certain cases, iridectomy is the lesser evil. Thus, Blanco advises its employment in the stage of intumescence of the lens, in which the expulsion of the cortical masses is apt to be very difficult. Again, in the case of patients who are likely to be restless, or who cannot, from their generally disturbed health, be kept rigidly still for the first period after the operation, Blanco would perform an iridectomy.

He does not agree with those who perform it when one eye only remains, for he says that if iridectomy offers better chances of success, it should always form part of the operation.

Blanco, in certain cases, even recommends a preliminary iridectomy; such, for example, as cataracts with high tension, and some cases of complicated cataract. H. GRIMSDALE.

(7) **Gros** and **Fromaget** had the unusual experience of having, within a few weeks, two cases which they believed to be examples of expulsive hæmorrhage, and in one of which they did on the second eye, three weeks before the extraction, a preliminary sclerectomy, in order to reduce the intra-ocular pressure.

The first case was that of a woman, of 62 years, seen in March, 1916, with cataract, advanced in right, complete in left, eye, with tension, projection, and pupil reactions all satisfactory. There was some ocular protrusion, and she had formerly had 5D. to 6D. of

myopia. On March 12th, operation was done, special care being taken to avoid any speculum-pressure on a prominent globe. Corneal incision, iridectomy, and extraction all passed off well, although the patient was not very good, when suddenly a large globule of apparently normal vitreous appeared between the lips of the wound, to be quickly succeeded by more vitreous. It was noted that there was no pressure on the eyeball, but that the patient complained of violent ocular and orbital pains. The vitreous was cut off, and a fairly firm bandage applied, not a single drop of blood having been seen. Forty-eight hours later, the first dressing was removed, even then not stained with blood, when the decompression led to violent hæmorrhage and the reappearance of the original pains. The globe atrophied, and the patient disappeared.

The second case was that of a man, aged 52 years, who looked, however, from his facies, gait, and hard, tortuous radials and temporals, more like 70; there was no albuminuria nor cardiac *bruit*. He had a double complete cataract, apparently satisfactory in every way, and he had not, to judge from the history, been myopic before. On May 23rd, 1916, operation was done on the right eye, patient's behaviour was ideal, the Pley's speculum was removed after the iridectomy was done and the lens extracted satisfactorily. For some seconds he remained immobile, with his eyes gently closed, when he felt a violent ocular pain, at the same time as the operator noted the upper lid raise itself, lose its folds, become distended, and finally open to allow large masses of normal, clear, non-blood-stained vitreous to escape between the lids, so that in a few seconds the globe became a mere empty shell. A slightly compressive bandage was applied. In twelve hours the pain ceased; still no external hæmorrhage; but the globe atrophied.

On account of the risks of glaucoma, the authors, differing from Warlomont and Valude, decided against couching the lens of the other eye, and, instead, they determined to do a preliminary sclerectomy, to be followed by the extraction in two or three weeks when the choroid should have accustomed itself to the new ocular tension. Accordingly on June 24th, 1916, with an Elliot's 3mm. trephine, they made the sclerectomy well up towards the equator between the upper and outer recti, the choroid and retina also being cut, for vitreous presented. It was noted, *apropos* of his bad tissues, that the conjunctiva was very friable and tore away with the fixation forceps, and that a large hæmorrhage took place at the site of the novocain needle-puncture in the ocular conjunctiva. The result of the operation, however, was satisfactory; tension became −1. Pilocarpin was used twice daily from July 7th to 15th, when the lens was extracted under cocain, with the man lying in his bed. Corneal incision was made slowly without conjunctival flap and without incident, while the speculum

was removed after the iridectomy, and the eye left in repose under the lowered upper lid. Capsule was opened and nucleus extracted slowly, iris *toilette* was purposely avoided, and a fairly tight bandage applied and strict immobility was enjoined. Two hours later, no pains had developed. Recovery uneventful. Vision with + 10D. was 1/2. At the end of July the right was enucleated for fear of irido-cyclitis, and section of the globe showed blood-clot collected between choroid and sclera, with retina entangled in corneal scar.

The authors consider the loss of vitreous in their cases to be due to extensive detachment from hæmorrhage beneath the choroid, and believe the hæmorrhage to be due, in the absence of glaucoma and hæmophilia, to an abnormal fragility of the vessels and general unhealthy condition of the tissues. They believe that the vascular rupture precedes the detachment and arises from the sudden alteration of the relation between the tension of the globe and the blood-pressure in its vessels. They think the sclerectomy likely to allow of this altered relationship being more gradually and therefore more safely established. W. C. SOUTER.

II.—DYSMETROPSIA.

Wilson, S. A. Kinnier (London).—Dysmetropsia and its pathogenesis. *Trans. Ophth. Soc. U.K.*, Vol. XXXVI (1916), p. 412.

Kinnier Wilson prefers the term dysmetropsia to the previously used term dysmegalopsia for the class of case in which there is defect in the visual appreciation of the measure of size of objects, whether by over-estimation or under-estimation. He passes briefly over the occurrence of this phenomenon under physiological conditions to the consideration of its appearance in definite pathological states.

Among the diseases in which it has come under the author's own observation are such varied conditions as tabes dorsalis, syphilitic basal meningitis, disseminated sclerosis, migraine, cerebral tumour, cerebral softening, epilepsy (both *grand* and *petit mal*), and hysteria.

He makes a provisional classification into two main groups, *viz.*, dysmetropsia of peripheral origin and of central origin. The latter group may be further subdivided into cortical and transcortical varieties.

He next gives details of cases to illustrate his classification. As types of the first group the cases used are one of tabes, one of syphilitic basal meningitis, and one of disseminated sclerosis. In the last case the defect was not so much in estimating the size of objects as their distance.

To illustrate the second group, subdivision (*a*) cortical or subcortical group (projection system), he describes a case of migraine and one of epilepsy. To illustrate subdivision (*b*) transcortical group (associative systems) including so-called psychical cases, he describes two hysterical cases and one of cerebral tumour with Jacksonian epilepsy.

A diagram illustrating Hughlings Jackson's "lowest, middle, and highest levels" explains the classification scheme. Thus, the peripheral mechanism or "lowest level" starts at the retina, inflammation of which may be accompanied by dysmetropsia from displacement of the retinal end organs. It will include on the sensory side the afferent stimuli from the contracting ocular and ciliary muscles. Wilson does not consider that these stimuli have much, if any, share in the production of dysmetropsia. On the motor side there is the set of lower motor neurones from the linked oculomotor nuclei in the midbrain to the internal recti, ciliary muscles, and the sphincters of the irides. He quotes Fuchs's explanation of the micropsia said to occur in paralysis of accommodation and the macropsia said to occur in spasm of accommodation. With this he does not agree, as he cannot admit that there is such a thing as a motor-cell sensation, and says that there is no satisfactory evidence that a motor-innervation current of itself produces a sensation of strain or effort. Wilson himself very much doubts, from his own observation, if dysmetropsia does occur in paralysis or spasm of accommodation, but considers that a more appropriate explanation would attribute it to a disturbance produced by interference with the accommodation in the acquired retinal scheme, or system, whereby we determine the relative size and distance of objects.

Wilson devotes some space to the vexed question of the mechanism of the estimation of distance. He is of the opinion that accommodative effort, as such, has little importance, and that the different factors, retinal disparation and psychology, play parts differing widely in various individuals. As regards the influence of the accommodation, he says that it is more probable that the necessary afferent stimuli for the activity of the cortical accommodation centre are derived from retinal impressions passing first to the cortical half-vision centres and thence to the cortical accommodation centre.

In an appendix Wilson collects all the cases he can find recorded in the rather scanty literature of the subject and endeavours to classify them under the scheme outlined in his paper. E. E. H.

III.—REMEDIES.

(Second Notice.)

(1) **Bruere, G. E. (Portland, Oregon). — Keratitis neuroparalytica, with report of a case.** *Ophthalmology*, October, 1913.

(2) **Gebb, H. (Greifswald).— Chemotherapy in ophthalmology, excluding Salvarsan. (Chemotherapie in der Augenheilkunde mit Ausschluss des Salvarsans.)** *Zeitschrift für Augenheilkunde*, Bd. XXXII, S. 265, 1914.

(3) **Ticho (Jerusalem).—Upon trachoma treatment in schools. (Ueber Trachombehandlung in den Schulen.)** *Zeitschrift für Augenheilkunde*, Bd. XXXII, S. 368, 1914.

(4) **Barnert, C. (New York). — Treatment of gonorrhœal ophthalmia.** *Medical Record*, February 5th, 1916.

(5) **Clapp, C. A. (Baltimore).—A report of six cases treated with tuberculin, including cases of keratitis, choroiditis, and cyclitis.** *Annals of Ophthalmology*, Vol. XXV, No. 3, July, 1916.

(6) **Darier, A. (Paris).—General methods of treatment. (Médications générales.)** *La Clinique Ophtalmologique*, août, 1916.

(7) **Darier, A. (Paris).—Intra-ocular hæmorrhages and their treatment: vitreous hæmorrhages, recurrent hæmorrhages of adolescents, expulsive hæmorrhages, hæmorrhagic retinitis, etc. (Des hémorragies intra-oculaires et de leur traitement: hémorragies vitréennes, hémorragies récidivantes des adolescents, hémorragies expulsives, rétinites hémorragiques, etc.)** *La Clinique Ophtalmologique*, septembre, 1916.

(8) **Heckel, Edward B. (Pittsburgh).—Report of a case of melanosarcoma of the orbit, treated with radium.** *Archives of Ophthalmology*, Vol. XLV, No. 5, September, 1916.

(9) **Risley, S. D. (Philadelphia).—Lacrymal drainage apparatus.** *Therapeutic Gazette*, September, 1916, and *Medical Review of Reviews*, January, 1917.

(10) **Terrien, F. (Paris).—The employment of X-rays in the treatment of visual disturbances of hypophyseal origin. (Le traitement par les rayons X des troubles visuels d'origine hypophysaire.)** *Archives d'Ophtalmologie*, septembre-octobre, 1916.

(11) **Boys, A. H. (St Albans.)—Collosol argentum.** *Brit. Med. Journal*, October 28th, 1916.

(12) **Orcutt, D. C. (Chicago.)—Results of salvarsan in ocular conditions.** *Ophthalmology*, October, 1916.

(13) **Maxey, E. E. (Boise).—Keratitis neuroparalytica resulting from alcohol injections for facial neuralgia, with report of a case.** *Ophthalmology*, October, 1916.

(14) **Darier, A. (Paris).—General methods of treatment. (Médications générales.)** *La Clinique Ophtalmologique*, octobre, 1916.

(15) **Finzi (London).—Recurrences in the orbit after removal of endothelioma of the lacrymal gland. Treated by radium.** *Trans. Ophth. Soc. U.K.*, Vol. XXXVI (1916), p. 244.

(16) **Jessop, W. H. (London).—Epithelioma of the upper lid cured by radium.** *Trans. Ophthal. Soc. U.K.*, Vol. XXXVI (1916), p. 245.

(17) **Cross, F. R. (Bristol).—Severe kerato-iritis cured by tuberculin.** *Trans. Ophth. Soc. U.K.*, Vol. XXXVI (1916), p. 282.

(1) After general remarks bearing on the innervation of the cornea and the distribution of the fifth cranial nerve, **Bruere** reports a case of neuro-paralytic keratitis in a syphilitic subject occurring a few months after injection of salvarsan. He has found no other reference to a lesion of the fifth nerve following the use of salvarsan. The reviewer has had one such case under observation for some time. In Bruere's case the condition showed considerable improvement under treatment with potassium iodide and injections of grey oil. A. J. BALLANTYNE.

(2) **Gebb** is the author of an article which to some extent summarizes our present knowledge of chemotherapy.

The object of chemotherapy is to provide substances which exert a specific action upon parasites without injuring the tissues of the host. Such bodies, however, have not been found; we have only, so far, succeeded in discovering substances which have a more powerful action upon the parasites than upon the host.

The author first alludes to the work of Stilling and others with various aniline dyes, and then treats certain organisms in detail.

Staphylococci.—Stilling and Wortmann found that pyoktanin in a concentration of 1:10,000 killed staphylococci in fifteen minutes; 1:50,000 was fatal in an hour. Clinical experience shows that this drug diminishes the secretion in infections with staphylococci, doubtless because of its disinfectant properties. Römer, Gebb, and Löhlein showed that many aniline dyes killed staphylococci in a few minutes. Among them are mentioned: methyl-violet,

brilliant green, fuchsine, and others. Again, clinical experiment proves that these dyes have a therapeutic action in conjunctivitis caused by staphylococci.

Asurol has been a failure, and is toxic.

Neither zinc nor silver nitrate is able to kill staphylococci, according to Schneider, but zur Nedden found that 1 per cent. silver nitrate had a bactericidal action. All observers are agreed upon the powerful action of the mercurial salts, especially the oxy-cyanide.

Diplobacilli.—In 1897, Morax and Axenfeld found that zinc sulphate had an almost specific effect upon diplobacillary conjunctivitis.

Axenfeld states that zinc sulphate was more efficient than either silver nitrate or mercuric perchloride. This view has been confirmed by a host of ophthalmologists, and one would imagine that it was beyond criticism. Rimowicz, however, found that zinc sulphate had little action in killing growths of the diplobacillus, and that silver nitrate was far more potent. Paul came to the same opinion, but Silva found that even small amounts of zinc sulphate inhibited the growth of this bacillus. zur Nedden found that zinc had no action whatever upon a culture of the diplobacillus. Cyanide of mercury killed it at once. Schneider observed that zinc had no action. Reis, too, could not persuade himself that zinc inhibited the growth.

Römer, Gebb, and Löhlein found that aniline dyes inhibited the growth of the diplobacillus, and eventually killed it. This is true of both the basic and acid dyes. They also showed that, clinically, a conjunctivitis caused by the diplobacillus was promptly cured by those dyes.

And yet, in spite of all this bacteriological work, which seems to prove that zinc sulphate has no action upon the organism, every practical ophthalmologist knows that in this salt we possess a specific in the treatment of the disease.

Pneumococci.—Silva found that zinc salts and silver nitrate had little or no action upon cultures of the pneumococcus. Schneider confirmed this result, and found that oxy-cyanide of mercury killed the cultures. Römer, Gebb, and Löhlein found that none of the ordinary disinfectants killed the organism in less than ten minutes, whereas aniline dyes acted promptly. Methylene blue was one of the successful agents.

Morgenroth introduced a new drug, optochin. This is the trade name for ethyl-hydrocupreine hydrochloride, a derivative of quinine. He found that, both in *vitro* and clinically, it had a powerful action in killing the pneumococcus. It had also a well-marked anæsthetic action upon the cornea. These facts have been confirmed by A. Leber, Goldschmidt, Schur, and Darier.

Imre has obtained good results with pyocyanase, and with ¼ per cent. perhydrol.

Elschnig and Kraupa prefer oxy-cyanide of mercury to disinfect the conjunctival sac before operations.

Augstein reports that neutral red is a useful drug to use for ulcus serpens.

Xerosis bacillus.—It is doubtful how far this organism is pathogenic for the interior of the eye, but there are some grounds for supposing that it is not so innocuous as it has been supposed to be.

Römer, Gebb, and Löhlein find that aniline dyes are bactericidal for this bacillus.

Gonococci.—Römer, Gebb, and Löhlein find that the silver salts have no bactericidal action upon the gonococcus *in vitro*. The aniline dyes kill them at once. They are not yet able to speak definitely regarding the clinical value of these substances.

The essence of the whole paper seems to be that in the aniline dyes we possess disinfectants which kill all the organisms we are concerned with in the shortest possible time. This may or may not be true of experiments *in vitro*, but clinical experience has by no means always confirmed pathological experiment.

T. HARRISON BUTLER.

(3) **Ticho** gives an account of the methods he adopted in the treatment of trachomatous children in the Jewish Schools of Jerusalem. Ticho is in favour of painting the lids with solutions of perchloride of mercury. T. HARRISON BUTLER.

(4) This paper deals with the action of cresatin, one of the phenol derivatives. Of this drug Cushny remarks that it is less poisonous to mammals and less irritant, and at the same time seems to be more destructive to microbes, than carbolic acid.

Barnert claims that the duration of gonorrhœal ophthalmia when treated with this drug is reduced to 48 hours. In most cases, but one application was found necessary, and never more than two. Gonococci were rarely observed after the first application and never after the second. He gives notes of five illustrative cases.

The conjunctival sac is first cleared of secretion by means of a stream of warm physiological salt or saturated boric acid solution from an undine. This is followed by the instillation of a drop or two of 1 per cent. cocaine. Allowing a few minutes for the anæsthetic action to occur, a small cotton swab mounted on a toothpick is used to apply a drop of the pure drug to the mucosa of the conjunctival sac. It is imperative to cover the entire surface of the mucous membrane in this application. No force is used, and particular care is exercised to avoid injuring the cornea. The further treatment consists in keeping the conjunctival sac free

from secretion, and the repetition of the application, should this appear necessary. E. E. H.

(6 and 14) In the July number (1896) of *La Clinique Ophtalmologique*, **Darier** published an article,* with the title *Introduction à la Thérapeutique Oculaire*, which was possibly the opening chapter of his forthcoming book on ocular therapeutics. The present instalments concern the ways of administering mercury, and commence by an account of the mode of action of mercury, not only in syphilis, but in many other morbid conditions. Then follow details of the correct methods of employing inunction, subcutaneous and intramuscular injections, intravenous injections, and, lastly, administration by the mouth. Formulæ are given in full for the best ways of making up the various preparations for actual use.

ERNEST THOMSON.

(7) **Darier** takes as his text the recent communication by Ormond to the Ophthalmological Society of the United Kingdom, on the possibility of bringing about the resorption of vitreous hæmorrhages. He details the methods mentioned by Ormond and ends this part of his article with a criticism. "All these methods have certainly a real importance, but the most active and most efficacious of all is undoubtedly local blood-letting, and even general blood-letting in severe cases. . . . . It is astonishing that Ormond does not say a word about the influence, which is nevertheless considerable, of blood-letting on the resorption of intra-ocular hæmorrhages which are of traumatic origin or essentially organic, especially when the operation is performed before the hæmorrhage has become organised. This is the first of all the therapeutic indications in intra-ocular hæmorrhage."

From this point in his article, Darier appears to branch off into his own views of the treatment of recurrent intra-ocular hæmorrhage of adolescents, expulsive hæmorrhage resulting from operations or penetrating wounds, hæmorrhage into the anterior chamber, and hæmorrhagic retinitis. He mentions such a multitude of methods of treatment that this part of the article is almost impossible to condense and should be studied in the original.

ERNEST THOMSON.

(8) **Heckel** reports a case of melanosarcoma of the orbit treated with radium. The neoplasm was kept in absolute abeyance for two years and four months, and the patient was enabled to follow his vocation for over two years, at the end of which time he was becoming gradually overpowered by metastatic dissemination of the growth, and general cachexia. Heckel strongly advises the use of one application of 100 mg. of radium element, rather than that of several applications of a less amount.

R. H. ELLIOT.

*For abstract see BRITISH JOURNAL OF OPHTHALMOLOGY, January, 1917, p. 67.

(9) **Risley** believes that the reputation for chronicity and intractability possessed by lacrymal affections is often due to the harsh or violent methods employed to cure them. The forcible passage of probes, for example, causes injury, either by fracturing the bony walls of the canal or by tearing the vascular soft tissues. In many cases the affection is dependent upon, or associated with, disease or deformity in the nasal fossa, the effect of which is to block the lower valve-like opening of the nasal duct. That factor should be sought for in every case of lacrymal disease. Often the lacrymal retention was transient and merely part of an acute coryza or so-called "cold in the head." This, if often repeated, may doubtless lead to permanent thickening and closure of the lumen of the duct in portions of its course. Another common cause of retained tears is to be found in partial or complete closure of one or both puncta lacrymalia from blepharitis or catarrhal conjunctivitis.

Risley calls attention to the fact that anything like rough treatment of purulent dacryocystitis may be dangerous. Thus, he relates a case where persistent attempts to force an opening through the nasal duct resulted in death from infection of the cavernous sinus, and mentions another in which a fatal issue threatened. His own procedure is to dilate the punctum and canaliculus and to wash out the contents of the sac. Cocain (4 per cent.) and adrenalin (1 : 5,000 solution) are carried into the sac, allowed to remain for ten minutes, and then repeated, and the same solutions sprayed into the nose. It will then often be found possible to inject an alkaline wash through the nasal duct. When this succeeds, the sac and duct are irrigated with silver nitrate (grain 1 to one ounce) or with a light wine-coloured solution of tincture of iodine. Failing in the attempt to pass fluids through the nasal duct, the treatment is repeated 24 hours later, and, in case of failure, the lower canaliculus is slit, and a fine ductile probe, with a bulbous end, is passed though the duct, or, failing in this, a No. 3 or No. 4 of the Bowman series is substituted. The duct once rendered physiologically patulous, the more or less chronic inflammation of the sac recovers under the influence of the iodine solution, repeated as often as required. S. S.

(10) The employment of radiography in tumours of the brain has seldom proved helpful in diagnosis. In tumours of the hypophysis, however, owing to the alterations induced in the sella Turcica, its diagnostic value is fully established. Surgical measures for dealing with tumours of the hypophysis are so generally unsuccessful that radio-therapy, in addition to the administration of suitable drugs, is well worthy of consideration. This method of treatment has been recommended by de Lapersonne and Cantonnet, Gramegna, Béclère, and Jaugeas. The action of X-rays on epithelioma, sarcoma, and

lymphoma in other situations being well known, it seems natural to submit tumours of the hypophysis to their influence. A certain number of cases have been successfully treated by this means.

Apropos of two new examples, one under observation by the writer for eight years, and one under de Lapersonne, **Terrien** has collected the published records of hypophyseal tumour treated by the application of X-rays; the number so obtained, including his own, is ten.

The *technique* followed by Terrien is that described by Béclère (*Journal de Radiologie*, 1914, No. 1). Two paths have been utilised by which the X-rays may reach the hypophysis; one from the mouth, the other from the surface of the skull. The buccal path is the most direct and offers a relatively thin layer of obstructing tissue, but the size of the buccal cavity limits the dimensions of the cylinder, especially as when in the mouth, the tube must be directed obliquely upwards. Moreover, it is difficult to maintain the tube in position for any length of time.

Béclère advises that the employment of the buccal path should be supplementary to that of the cutaneous through the fronto-temporal region; by this latter method the dose which reaches the tumour can be doubled or quadrupled by reason of the many possible points of application on the surface of the skull. The best positions are the two temporal fossæ, owing to the thinness of their bony wall.

Although the author gives a description of the methods of application of the X-rays, Béclère's paper referred to above may be consulted for more detailed instructions: the treatment should be undertaken by an expert radiographer.

Brief clinical notes and charts of the fields of vision of the previously recorded cases, and fairly full notes of the new cases, are given, and form interesting reading. Only the two examples under Terrien and de Lapersonne will be quoted in this abstract. In all the cases the results of treatment were encouraging; in some the improvement in the acuity of vision and enlargement of the fields was very marked, but in two of the eight earlier cases the gain was only temporary.

Terrien's patient, a male, *æt.* 44, in Nov., 1908, presented subjective symptoms of failing vision without signs of disease and with normal acuity to tests. In May, 1909, vision in R.=0.5; in L.=0.6; a bitemporal paracentral scotoma for colours; no ophthalmoscopic evidence of disease; no signs of syphilis; X-ray examination entirely negative; some mental and physical torpor. Active treatment by mercury prescribed and continued until December, 1910, without improvement. Progressive loss of the right visual field; the characters of this loss, in spite of the absence of acromegaly and radiographic evidence of changes in the sella Turcica, led to a diagnosis of

hypophyseal tumour. In April, 1911, organotherapy ("*cachets d'hypophyse*") was begun. This was continued until February, 1912, without benefit. While the field and vision of the left eye (V.=0.9) underwent no material change, the right field became restricted to a small sector in the upper-nasal part, and vision fell to 0.2. At this time, characteristic signs of acromegaly developed and slight enlargement of the sella became evident. Radio-therapy was then adopted: thirty *séances* of treatment, each consisting of four applications of three minutes' duration, one on each temporal and one on each supra-orbital region. After the tenth sitting, each visual field showed a slight enlargement. After the twentieth, the increase in the fields was quite obvious (shown in charts), and vision was R.=0.12, L.=0.9.

During the last ten *séances*, however, the small area of vision in in the right field disappeared completely and permanently. X-ray treatment was then discontinued, and no further therapeutic measures were employed. During the subsequent four years the visual acuity and field of the left eye were maintained; the blindness of the right eye persisted.

de Lapersonne's patient; a female *æt.* 24; first seen in June, 1914; failure of vision for several months; with correction of astigmatism, V.=0.8.; incomplete bi-temporal hemianopia, the loss being greater in the left field. Slight but characteristic signs of acromegaly; marked enlargement of the sella Turcica. A few months later, there was more restriction of the left visual field and a large paracentral scotoma in the right field.

X-ray treatment was then adopted. Perimetric examination after each series of applications showed an increase in the extent of the fields, especially of the left, with diminution and ultimate disappearance of the paracentral scotoma in the right field. The record of this case is much less complete than that by Terrien, and no statement concerning the number and duration of the applications is appended. Treatment was interrupted by the departure of Béclère to the war.

The author's comments upon and discussion of this series of cases, although somewhat prolix, are of much interest, and the subject is one which merits careful consideration. If, as seems probable, radiotherapy proves a valuable adjunct to, or in some instances an effective substitute for, organotherapy, it adds materially to the means of dealing with a serious and often intractable malady.

That radio-therapy is applicable to all cases of hypophyseal disease need scarcely be contradicted. Béclère, from his experience, has formulated certain indications and contra-indications.

In the group of cases, sometimes termed the *ophthalmic* type of tumour of the hypophysis, in which the symptoms are purely local

and due to compression of contiguous structures by the growth, radio-therapy should be employed; its chances of success are greater if treatment is begun in an early stage, before much destruction of nerve tissue has occurred. In the group in which there are also distant trophic changes, gigantism and acromegaly, the employment of X-rays is indicated only at the commencement and during the progressive period of the disease, *i.e.*, during the stage of hyperplasia and hyperpituitarism. In the late stage, marked by an arrest of hyperosteogenesis, loss of muscular power, somnolence, cerebral torpor, and loss of hair, radio-therapy is contra-indicated.

J. B. LAWFORD.

(11) **Boys** mentions a number of cases where collosol argentum was used with success. Among them he includes that of a girl, aged 18 years, suffering from ulcer of the cornea, healed in an astonishingly short time after the instillation of two drops of the remedy. S. S.

(12) Using salvarsan and neo-salvarsan in various ocular conditions, **Orcutt** obtained the following results.—In five cases of optic atrophy he got marked improvement in two and slight improvement in one. In the two which showed marked improvement the Wassermann test was negative (before treatment). One case of paralysis of oculomotor nerves, with negative Wassermann, was cured. Of two cases of sympathetic ophthalmia one, with negative Wassermann, was improved, and one, with positive Wassermann, was cured. Two cases of interstitial keratitis, one of which had positive Wassermann, were greatly benefited. Three cases of neuro-retinitis with vitreous opacities were cured, two of them having positive Wassermann.

The author believes that the best results were obtained in those cases which, after the injections, showed a reaction in the form of ciliary redness without pain. A. J. BALLANTYNE.

(13) The earlier history of the case reported by **Maxey** was that the patient had begun to suffer from severe facial neuralgia after having a growth of some kind removed from the lower lip by some corrosive paste. The attacks increased in severity and frequency, and several treatments were tried. He received temporary relief from resection of the mental nerve, but when there was recurrence of the neuralgia, he received a series of eight alcohol injections. Here, again, there was temporary relief, but deep-seated pain returned, accompanied by anæsthesia and paralysis of the left side of the face, including the eyelids and eyeball. When seen by the author, there was lagophthalmos, ectropion, conjunctivitis, and corneal ulcer with hypopyon. Complete destruction of the eyeball ensued, and the eye was excised.

The cause of the neuralgia cannot be clearly determined, but the anæsthesia and paralysis are to be traced to the alcohol

injections which were apparently aimed at the second and third divisions of the trigeminal nerve. It is assumed that in attempting to reach the foramen rotundum some of the alcohol entered the orbit. A. J. BALLANTYNE.

(15) Twelve months after removal of an endothelioma of the lacrymal gland by Wray, there was a recurrence necessitating exenteration of the orbit. A fresh recurrence followed some months later. This was treated by **Finzi** with radium bromide. After three applications, spread over four months, ulceration had healed, and the tumour-like masses were no longer palpable. No recurrence after nearly four months had elapsed. Nevertheless, more radium will be applied later on. S. S.

(16) A man, *æt.* 55, had been engaged in X-ray work for many years, and had in consequence lost all the fingers of one hand. He developed a swelling towards the centre of the left upper lid, 1 cm. in diameter and 0·5 cm. in height. The growth ulcerated from time to time. It was diagnosed by **Jessop** as an epithelioma. It had been treated without success with glacial acetic acid and the actual cautery, and excision had been recommended. Jessop removed the accessible portions of the growth, and 10 mg. of pure radium bromide was applied, without a screen, for one hour. There was marked reaction. No recurrence in two months. S. S.

(17) **Cross's** patient, a woman, aged 32 years, had lost one eye from glaucoma following iritis and keratitis, probably of tuberculous nature. Her remaining eye became seriously inflamed from interstitial keratitis of tuberculous type. Its vision was reduced to 5/60. The condition was treated with tuberculin (human and bovine), preceded by the employment of several small doses of Mehnarto's contra-toxin—that is, a mixture of the blood-plasma of reptiles sensitised in sheep's blood-plasma, which is stated to be entirely free from anti-toxins. The injections of tuberculin were commenced in July, and by the following October improvement in the state of the eye was noted. The injections were sometimes followed by general reaction, and during their course a small hypopyon made its appearance. In November, V. was 5/9. A relapse in the following month reduced V. to 6/24. In March, V. was 6/9. In the following month, V. was 6/9, and No. 1 Jaeger. The eye was free from inflammation, and the cornea almost clear. S. S.

BOOK NOTICES.

Emergency Ocular Surgery. (Chirurgie oculaire d'urgence.) "La Pratique de la Chirurgie de Guerre aux Armées." By M. LANDOLT. Paris: Vigot Frères. 1916.

The chapter on ophthalmic surgery in this text-book of military surgery is written by M. Landolt. It is intended to guide medical men at the front who are not specialists as to what cases they should deal with and what cases can more safely await the intervention of the ophthalmic surgeon. A concise account is given of the various treatments, operative or otherwise, that are necessary in the former class of case.

We do not find much to criticise. The author believes that lesions affecting the ciliary body are especially dangerous as regards sympathetic ophthalmia, a view not so generally held as was formerly the case. In treating of lid injuries, he very rightly lays considerable stress on the necessity for careful and accurate suture, a point the general surgeon is rather apt to overlook.

In dealing with infected corneal injuries, he recommends cauterisation with the red-hot squint hook, and adds that this must be carried into the clear corneal tissue. Perforation of the cornea, with escape of aqueous, he does not consider a serious accident. With this opinion we cannot agree, and consider that, in unskilled hands at any rate, the use of pure carbolic acid would be much safer and quite as efficacious.

He describes and illustrates a neat scleral stitch, which while drawing the scleral wound together, at the same time with the one thread slides the conjunctiva over the wound.

Landolt advises excision in early panophthalmitis after a wound in the ciliary region. Evisceration, or some such modification of it as was recently described by Colonel Lister, is probably a better operation in these cases.

The line illustrations are very clear and adequately illustrate the text; the illustrations from photographs are not quite so satisfactory, owing to the paper on which they are printed.

If the rest of the work is as clear and concise as this chapter it should be of considerable service to surgeons at the clearing stations. E. E. H.

Science and Industry with special reference to the National Physical Laboratory. By R. T. GLAZEBROOK, F.R.S. Teddington: W. F. Parrot. 1916.

Dr. Glazebrook, the Director of the National Physical Laboratory, gave an address to the Birmingham and Midland Institute on the

4th of December, 1916, which has been printed in the pamphlet under notice.

Although it contains no reference to optical work, it is deserving of notice in all scientific journals for the clear and overwhelming arguments it contains for the fuller endowment of scientific research.

Such endowment, as Dr. Glazebrook rightly points out, must come in the main from public funds, and must not, as has too often been the case in the past, be devoted to working out some point that is of direct commercial value. Dr. Glazebrook's words are so carefully chosen that we cannot do better than quote what he says on this subject:—

"Let us note then, in the first place, we must have scientific knowledge. That point I need not labour, but note also that to be successful, that knowledge must be pursued for its own sake. Each of the modern practical applications of science had its foundations in purely scientific work, and to quote Professor Gregory, in his recent book, discovery or the spirit and service of science, was not the result of deliberate intention to make something of service to humanity. It is hardly necessary to illustrate this; let me, however, give one classical example. The discovery of the laws of electro-magnetic induction is due to Faraday, and is described in his first three series of 'Experimental Researches,' published in 1831-33. Oersted, Ampère, and Arago had investigated some of the phenomena connected with the magnetic force produced by an electric current, and to Faraday it appeared clear that conversely it should be possible to produce electricity from magnetism, as he put it. It is difficult to picture the world to-day without electric power, and yet the whole development of electric machinery, as we know it, rests on the laws described in these brief scientific papers. Each advance of knowledge brings its benefits to mankind, and in a general way, Faraday may have hoped to be a benefactor to his race by widening the sphere of knowledge, but it was the desire to know the truth which led him on, and to which we owe such tremendous consequences.

"We must have the student of pure research, the genius who goes on his way discovering new truths, irrespective of consequences, laying bare more and more of Nature's secrets and unravelling her mysteries.

"In England we have never lacked such men; our roll of great discoverers has been a glorious one. Too frequently their lives have been hard and difficult, prophets without honour they have lived .... The endowment of pure science is essential; without it the attempt to apply science to industry fails." E. E. H.

Glaucoma: A Handbook for the General Practitioner. By R. H. ELLIOT, M.D., B.S. London: H. K. Lewis & Co., 136, Gower Street, E.C. 1917. 3s. 6d. net.

This book, as its sub-title shows, is written for the general practitioner, in the hope that it will save him from the mistake of overlooking cases of glaucoma which he may meet in the course of his work, and in order to put before him a concise account of present-day views regarding the pathology and treatment of glaucoma.

The author follows out the sub-divisions of his subject in their logical order, beginning with the anatomy and physiology of the parts concerned in glaucoma, its pathological anatomy and ætiology, its signs, symptoms, and diagnosis, and, lastly, its treatment.

A work of this kind, in which a discussion of debatable points, or even the citation of authorities, is out of the question, naturally bristles with controversial possibilities; but, aiming, as he does, at a short and concise statement of what he believes to be the views held by the majority of ophthalmologists at the present day, the author is bound to be dogmatic.

In the short chapter dealing with the diagnosis of glaucoma, the author draws a picture of the clinical course of an attack of simple primary glaucoma, of primary congestive glaucoma, and of absolute glaucoma; and then follows a chapter on the signs and symptoms, in which each part of the eye is taken in turn, and the changes which it may undergo in glaucoma are described. Keeping in view the fact that the book is written for the general practitioner, this latter section seems to blur somewhat the two pictures of simple and congestive glaucoma which it is desirable to keep clearly before the practitioner's mind. Perhaps the author presents his facts as he does in order to show that the different varieties of glaucoma are but different stages in one process; but, after all, if eyes are to be saved, the essential thing is that the general practitioner should learn to recognize a case of glaucoma when he meets it; and since the vast majority of cases present themselves in the simple, or in the painful, congestive form, there is a good deal to be said for the traditional method of dealing with these almost as if they were two separate diseases.

The paragraphs which deal with the differential diagnosis of glaucoma from other affections of the eye, might have been elaborated with advantage. The ophthalmic surgeon knows how insidious in onset and how subtle in its manifestations simple glaucoma may be, and since, as Elliot himself insists, early diagnosis is all-important if treatment is to have a chance, would it not have been wise to discuss with the practitioner all the signs and symptoms which may characterise the early stages, and to tell him frankly that if there is

enough in a case to raise a *susbicion* of this disease, it is his duty to refer it to the specialist? There is a paragraph on p. 33 which seems to suggest that if the general practitioner is in doubt as to the diagnosis of such a case, he should keep it under observation until the evolution of cupping of the disc and changes in the field of vision settle the question. Would such advice, if generally followed, be fair to the patient?

In the chapter on treatment, the author has given an excellent summary of the subject in small compass, and, while showing a natural preference for the trephining operation, he does not allow this to crowd out the other accepted forms of operative and non-operative treatment.

The remaining sections deal in an adequate way with secondary glaucoma, and with the congenital and juvenile forms.

A. J. BALLANTYNE.

NOTES.

Deaths.

THE death is announced, at the age of 91 years, of von Zehender, once professor of ophthalmology in the Universities of Bern and Rostock.

The deaths are announced from America of the following ophthalmic surgeons:—

H. M. Farquharson, Chicago, 54 years.
A. A. Vibbard, Albany, 48 years.
Roy G. Fisher, Chicago, 33 years.
W. F. Coleman, Chicago.
M. Pitcher, Sardinia, 31 years.
D. B. Farnsworth, Springfield, 67 years.
H. B. Erb, Allentown, 58 years.

* * * *

Applied optics.

THE Minister of Public Instruction in France has recommended the creation of an institute of applied optics, and, in co-operation with the Minister of Commerce, has nominated a commission to draft a suitable scheme.

* * * *

Appointments.

DR. GEORGE YOUNG has been appointed ophthalmic surgeon to the Essex County Hospital, Colchester.

Dr. Derrick T. Vail has been appointed consulting ophthalmologist to the Cincinnati General Hospital.

The Ophthalmological Society of Egypt at its meeting on April 16th, 1915, elected the following office-bearers:—Dr. M. Tahir, President; Dr. Oulton, Vice-President; Dr. MacCallan, Treasurer; Dr. A. F. El-Rasheed, Secretary General; and Dr. Zaki Seddick, Reporting Secretary.

The following officers have been appointed by the American Academy of Ophthalmology and Oto-Laryngology:—Dr. W. L. Dayton, President; Dr. E. Stieren, first Vice-President; Dr. A. C. Magruder, second Vice-President; Dr. J. Green, junior, third Vice-President; Dr. S. Large, Treasurer; and Dr. L. M. Francis, Secretary.

The office-bearers elected by the Chicago Ophthalmological Society are as follows:—Dr. P. Guilford, President; Dr. F. Lane, Vice-President; Dr. M. Worthington, Secretary and Treasurer; and Dr. G. W. Mahoney, Councillor.

The following officers were elected at the eighth semi-annual meeting of the Sioux Valley Eye and Ear Academy:—Dr. F. H. Roost, President; Dr. R. D. Alway, Vice-President; and Dr. L. N. R. Grosvenor, Secretary-Treasurer.

FUTURE ARRANGEMENTS.

1917.

Ophthalmological Society of the United Kingdom	May 3rd, 4th, and 5th.	London.
Midland Ophthalmological Society	June 5th.	Oxford.
Section of Ophthalmology, Royal Society of Medicine.	June 13th.	1, Wimpole Street, London, W.
Oxford Ophthalmological Congress	July 12th and 13th.	Keble College, Oxford.